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The Commonwealth of Massachusetts

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1920

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DIVISION OF REGISTRATION

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



BOSTON

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PUBLICATION OF THIS DOCUMENT  
APPROVED BY THE  
SUPERVISOR OF ADMINISTRATION.

# The Commonwealth of Massachusetts

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DEPARTMENT OF CIVIL SERVICE AND REGISTRATION,  
STATE HOUSE, BOSTON, JAN. 13, 1921.

*To the Honorable Senate and House of Representatives.*

GENTLEMEN:—The Director of Registration in the Department of Civil Service and Registration, Division of Registration, submits herewith the report of the Board of Registration in Optometry, which report is to be published separately from the general report of the Director of Registration.

Respectfully,

WILLIAM S. BRIRY,  
*Director of Registration.*





# MEMBERS

OF THE

## MASSACHUSETTS BOARD OF REGISTRATION IN OPTOMETRY.

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1925. MATTHEW J. FOWLER, *Chairman*, 171 MERRIMACK STREET,  
HAVERHILL.
1922. HOWARD C. DOANE, *Secretary*, 59 TEMPLE PLACE, BOSTON.
1921. MATTHIAS W. CONROW, M.D., 31 MAPLE STREET, SPRING-  
FIELD.
1923. SAMUEL W. BAKER, 297 UNION STREET, ROCKLAND.
1924. F. JULIUS QUIST, M.D., PARK BUILDING, WORCESTER.



# The Commonwealth of Massachusetts

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## R E P O R T .

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BOARD OF REGISTRATION IN OPTOMETRY,  
146 STATE HOUSE, BOSTON, Dec. 1, 1920.

TO WILLIAM S. BRIRY, *Director of Registration.*

SIR:—The Board of Registration in Optometry has the honor to submit to you its ninth annual report as required by chapter 700, Acts of 1912.

The Board has held during the year three regular examinations. Sixty-four candidates were examined, including 37 who had taken previous examinations. Of this number, 25 passed and 39 failed. On February 10, 11, 12 and 13, 16 candidates were examined, all being candidates for re-examination. Ten candidates were successful; 2 passed all subjects but one; 2 failed in more than one subject; 2 failed in re-examination of one subject. On June 8, 9, 10 and 11, 28 candidates were examined, including 9 who had been previously examined; 5 passed and 23 failed; 7 passed in all subjects but one; 5 failed in re-examination of one subject; 11 failed in more than one subject. On November 9, 10 and 11, 20 applicants were examined, including 14 who had been previously examined; 10 passed and 10 failed; 3 failed in re-examination of one subject; 7 failed in more than one subject. The following written examination was given Nov. 9, 10 and 11, 1920:—

## ANATOMY AND PATHOLOGY.

Dr. M. W. CONROW, NOVEMBER, 1920.

1. Name and describe briefly the essential parts of the lacrimal apparatus.
2. Name the orbital muscles and describe their attachments to the eyeball.
3. Describe Tenon's capsule.
4. Name and describe briefly the coats of the eyeball.
5. Describe the ophthalmoscopic appearance of a typical case of medullated nerve fibers of the retina.
6. Describe chalazion and hordeolum; give their essential differences. What do you consider the causes of each?
7. What is coloboma of the choroid; anterior synechia; posterior staphyloma?
8. How would you distinguish between conjunctivitis and iritis?
9. What is glaucoma; trachoma?
10. What is keratoconus? Causes?
11. Name the bones of the orbit.
12. Describe the crystalline lens, and how is it held in place?

## PHYSIOLOGY AND PHYSIOLOGICAL OPTICS.

Dr. F. J. QUIST, NOVEMBER, 1920.

Answer ten only of the following twelve questions:—

1. Discuss how and by what means you are conscious of seeing an image.
2. Name and define the function of the three outer coats (tunics) and the three refractive media (humors) of the eyeball.
3. What nerves and muscles are involved in paralysis of accommodation? Name the causes of this condition.
4. Define near point, far point and amplitude of convergence.
5. Discuss presbyopia, myopia, latent and manifest hyperopia.
6. Define mixed astigmatism and unsymmetric astigmatism. Why do they cause asthenopic symptoms?
7. Define and give the effect on sight of the following: Zonular cataract, leukoma, macula and arcus senilis.
8. If a patient was hyperopic and suffered from insufficiency of the right internus muscle, would you prescribe a weak or strong lens? Give reasons why.
9. Describe fully what action paralysis of the fourth nerve would have on the eye.
10. Describe how and what you would see with an ophthalmoscope in glaucoma, malignant myopia and amblyopia exanopsia.
11. Describe fully binocular vision.
12. Name the most important structures of the retina and explain their functions.

## PRACTICAL OPTOMETRY.

H. C. DOANE, NOVEMBER, 1920.

Answer ten of the following twelve questions: —

1. Give in complete detail your method of procedure in making an examination of the eyes, and give your reasons for the order in which you use the various instruments and methods.

2. Describe three methods of determining the status of the extrinsic muscles at the reading distance.

3. Patient, aged twenty, obtains vision 20/20 O. U. with O. D. plus 2.00 sphere combined with a plus 1.00 cylinder axis 105°; O. S. plus 2.50 sphere combined with a plus .50 cylinder axis 75°. Has 6° esophoria. Placing in front cell of trial frame O. U., plus 1.50 sphere over above correction, patient reads with O. D. 20/40 type, with O. S. 20/60 type. What would you prescribe for constant wear?

4. Correction found was O. D. plus 1.50 sphere combined with a plus 1.75 cylinder axis 60°. Outline fully how this result was obtained by static skiametry (a) with plane mirror; (b) with concave mirror.

5. Patient complains of diplopia unless head is tipped to the right. What muscles are at fault, and how would you correct it?

6. How would you treat a case of marked anisometropia where vision of each eye separately, with correction on, is 20/20?

7. How would you handle the following cases?

(a) Myope of 4 diopters with exophoria of 6°.

(b) Myope of 2 diopters with esophoria of 3°.

(c) Hyperope of 4 diopters with exophoria of 3°.

(d) Hyperope of 2 diopters with esophoria of 6°.

(e) Hyperopic astigmatism of O. D. plus 2.50 cylinder axis 125°, O. S. plus 2.50 cylinder axis 60°, with cyclophoria.

8. How would you differentiate between a case of amblyopia and one of amaurosis?

9. Explain fully how you determine whether to prescribe prisms or to give prism exercise.

(a) Give your method of exercising the muscles with prisms.

10. Patient has progressive myopia. How would you treat the case?

11. (a) Describe fully the appearance of a normal fundus.

(b) How would you differentiate between a physiological and a pathological cupping of the disc?

(c) Of what value is the ophthalmoscope in determining the refractive power of the eye?

12. (a) Are subjective tests for astigmatism always made at 20 feet, and why?

(b) What are the reasons for using the fogging method of subjective examination?

(c) Can the fogging method be used intelligently without preceding it with objective tests?

## THEORETIC OPTICS.

S. W. BAKER, NOVEMBER, 1920.

Answer all of the following questions:—

1. As there are many sizes of candles, how can you select one that while burning will give illumination equal to "one standard candle power"?

2. The index of refraction for light passing into water is 1.33. What is the index of refraction for light coming from water into air?

3. What is the magnifying power of a +4. D lens held 10 inches from an emmetropic eye?

4. A plus lens, index 1.60, has a focus of 30 centimeters; one surface is convex with a radius of 12 centimeters. Give nature and power of other surface.

5. The objective lens of a telescope has a focal length of 15 feet. What will be its magnifying power with an eyepiece of three-quarters of an inch?

6. On a photograph taken of a building 30 feet high at a distance of 1,440 feet it appears one-eighth inch high. Give the power of the lens in the camera.

7. Give the formula for finding the index of refraction of a prism when the principal angle and the minimum angle of deviation are given.

8. Find the focal length of a convex mirror when the object is 40 inches in front of it and the image 10 inches back of it.

9. The focal length of a concave mirror is 12 inches. Where must a candle flame be placed to produce an image on a screen 20 diameters of the object?

10. A man whose eyes are 70 inches from the ground stands 4 feet from the surface of a small vertical mirror 12 inches long, which hangs on one wall of a room, lower edge on level with his eyes. The opposite wall of the room is 16 feet from the mirror; how much of the wall is seen reflected in the small mirror?

## THEORETIC OPTOMETRY.

S. W. BAKER, NOVEMBER, 1920.

Answer all of the following ten questions:—

1. State why the pinhole disc gives an improvement in vision that cannot sometimes be obtained with lenses.

2. In skiametry at the point of reversal, which mirror, plane or concave, gives the best reflex?

3. Describe your methods of dynamic muscle testing.

4. Is there any scientific reason why a white test card with black letters is more universally used than a black card with white letters?

5. In using the stenopaic slit a +2. D lens gives the best vision in the 45th meridian, and a -1. D in the 135th meridian; write the Rx.
6. What kinds of ametropia are revealed by the fogging method?
7. In using the ophthalmoscope, under what conditions is the indirect method preferable?
8. Is the stenopaic slit more accurate with a large or small pupil?
9. How do you measure positive and negative convergence?
10. In objective testing there is a wide margin in the astigmatic findings between the retinoscope and the ophthalmometer; which would you prescribe by, and why?

### PRACTICAL OPTICS.

MATTHEW J. FOWLER, NOVEMBER, 1920.

Answer all questions: —

1. (a) Explain two ways of proving that a prescription for a prism is filled accurately with the exact amount of prism.  
(b) How many millimeters would be required to decenter a +4.50 sphere to obtain a 2° prism?
2. The refractive condition of an eye is found to be myopic 1 diopter in the vertical meridian and hyperopic 1 diopter in horizontal meridian, also presbyopic 1 diopter. What lens would you use so as to incur least cost for near correction?
3. (a) When neutralizing a lens, looking at a distant object it moves in the same direction when the lens is moved up and down, right or left. What kind of a lens is indicated?  
(b) When object moves in the opposite direction up, down, right or left?
- (c) When object moves within one direction and against in the other direction?
4. (a) Explain by diagram six different forms of lenses.  
(b) State what error of refraction each will correct.
5. What curvature must be given to two surfaces of a wafer to produce 2.25 diopter reading addition, the distance correction being a +.50 sphere combined with a +1.00 cylinder, the lens to be made toric on a +6.00 diopter base curve?
6. Prescription reads as follows: —

O. D. +3.00 sphere = +2.00 cylinder axis 90. Decenter in 4 millimeters.

O. S. +4.00 sphere = +1.00 cylinder axis 180. Decenter in 4 millimeters.

What is the amount of each prism?

7. In the following prescription supply the left distance lens.

Distance: R.  $+ .50$  sphere =  $-1.25$  cylinder axis 150.  
L.

Reading: R.  $+2.00$  sphere =  $+1.25$  cylinder axis 60.  
L.  $+1.50$  sphere =  $+1.75$  cylinder axis 120.

8. Transpose the following:—

(a) Minus 3.00 cylinder axis 90 combined with plus 50 cylinder axis 180°.

(b) Plus 1.12 sphere combined with minus 50 cylinder axis 40°.

(c) Minus 1.50 sphere combined with plus 2.75 cylinder axis 160°.

9. (a) How are fused bifocals made?

(b) How are the reading parts of fused bifocals calculated for the proper amount of power?

10. Patient wearing spectacles calls for adjustment with right lens down and left up.

(a) How would you adjust it?

(b) If an eyeglass, how would you adjust it?

The Board has during the year followed its usual custom of devoting three days to written examinations and one day to practical demonstration. At the written examination candidates are assigned numbers, and the papers are corrected by the members of the Board under these numbers. A passing mark of 65 per cent is required in each subject. A candidate failing in one subject only is required to take that one subject at a subsequent examination. Candidates failing in more than one subject are required to take the full examination in all subjects again. In practical work the candidate is required to give a demonstration in the use of the various scientific instruments and methods of examination. This is to determine the candidate's fitness to carry on a comprehensive examination of the eyes.

As a result of recommendations made by this Board in our last annual report, amendments were made to the optometry law under chapter 512, Acts of 1920. These amendments went into effect in August. Under the new law the preliminary educational requirements are to be four years of high school, or its equivalent, this becoming effective July 1, 1921. Under the amendments all students, who are not enrolled in approved



optometric schools, are obliged to secure student certificates, and they are required to study the subjects enumerated in the law for a period of three years before being allowed to take the examination for registration.

There having been formed an International Association of Boards of Examiners in Optometry, our Board requested His Excellency the Governor to appoint a delegate to the meeting of this association held at St. Louis in June. The secretary was appointed to represent our Board at this meeting. A report of the proceedings of this meeting was sent to you. The principal purpose of this association is to bring about a uniformity in the methods of examination and to create uniform standards of educational requirements throughout the country. In order to raise the standards of education and to classify the various optometry schools, there has been established a council on education in the American Optometric Association, whose functions will be to investigate the various schools and classify them according to their standards and equipment. Our Board has voted to approve the work of this council, and to recognize those schools which are approved by the council.

Numerous reports of violations of the optometry law in this State have been investigated, and the Board has been successful in stopping these violations without prosecution by law.

In September His Excellency the Governor reappointed Mr. Matthew J. Fowler of Haverhill for a term of five years.

At the annual meeting held at the State House, Oct. 13, 1920, the Board organized for the ensuing year. Matthew J. Fowler of Haverhill was elected chairman, and Howard C. Doane of Boston was elected secretary.

During the last year 25 men have qualified for registration by examination. Three certificates have been revoked and 1 suspended. There is now a total of 909 registered optometrists in Massachusetts.

FINANCIAL REPORT.

*Receipts.*

Unexpended balance in hands of State Treasurer	
Nov. 30, 1919, . . . . .	\$1,961 90
Received from applicants for examination, . . . . .	575 00
Received from re-examination fees, . . . . .	95 00
Received from certificate renewals, . . . . .	1,740 00
Received from students' certificates, . . . . .	4 00
Received for duplicate certificate, . . . . .	5 00
	<hr/>
	\$4,380 90

*Expenditures.*

Cash paid for compensation of commissioners, . . . . .	\$1,636 95
Cash paid for clerical assistance, . . . . .	350 48
Cash paid for car fare and general office expense, . . . . .	791 45
	<hr/>
	2,778 88

Unexpended balance in hands of State Treasurer Nov.	
30, 1920, . . . . .	\$1,602 02

Respectfully submitted,

MATTHEW J. FOWLER, *Chairman.*  
HOWARD C. DOANE, *Secretary.*  
SAMUEL W. BAKER.  
MATTHIAS W. CONROW, M.D.  
F. JULIUS QUIST, M.D.





The Commonwealth of Massachusetts

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ANNUAL REPORT

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FOR THE

YEAR ENDING NOVEMBER 30, 1921

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DIVISION OF REGISTRATION

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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## The Commonwealth of Massachusetts

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*To the Honorable Senate and House of Representatives.*

GENTLEMEN: — The Director of Registration in the Department of Civil Service and Registration, Division of Registration, submits herewith the report of the Board of Registration in Optometry, which report is to be published separately from the general report of the Director of Registration.

Respectfully,

WILLIAM F. CRAIG,  
*Director of Registration.*

JAN. 1, 1921.





# The Commonwealth of Massachusetts

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## REPORT.

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BOARD OF REGISTRATION IN OPTOMETRY,  
146 STATE HOUSE, BOSTON, MASS., Dec. 21, 1921.

TO WILLIAM F. CRAIG, *Director of Registration.*

SIR:—The Board of Registration in Optometry has the honor to submit to you its tenth annual report as required by chapter 700, Acts of 1912.

The Board has held during the year three regular examinations. Sixty candidates were examined, including 35 who had taken previous examinations. Of this number, 20 passed and 40 failed. On February 15, 16, 17 and 18, 15 candidates were examined, 10 being candidates for re-examination. Two candidates were successful; 3 passed all subjects but one; 7 failed in more than one subject; 3 failed in re-examination of one subject. On June 7, 8, 9 and 10, 24 candidates were examined, including 9 who had been previously examined; 6 passed and 18 failed; 5 passed in all subjects but one; 3 failed in re-examination of one subject; 10 failed in more than one subject. On November 8, 9, 10 and 11, 21 applicants were examined, including 16 who had been previously examined; 12 passed and 9 failed; 3 failed in re-examination of one subject; 1 passed all subjects but one; 5 failed in more than one subject. The following written examination was given June 7, 8, 9 and 10:—

## PHYSIOLOGY AND PHYSIOLOGICAL OPTICS.

F. J. QUIST, M.D., JUNE 7, 1921.

Answer *ten* only of the following questions:—

1. Define the terms: Principal foci, nodal points, optic axis and visual angle.
2. Name and give the functions of the refracting surfaces and refracting media of the eye.
3. How would you diagnose aphakia? What degree of refractive error would you find?
4. Define amblyopia. Name three varieties, stating the causes of each.
5. Discuss functional error in the retina (amesthesia and hyperesthesia). What is the underlying cause and how would you treat such case?
6. Describe fully and give reasons for each step in testing a patient complaining of diplopia due to partial paralysis of right external rectus.
7. Give possible refractive symptoms and complications in partial dislocation of the lens; in complete dislocation anteriorly.
8. Discuss the action of mydriatics. Are they ever used to advantage in refraction?
9. Explain the changes which take place in presbyopia. In second sight.
10. Discuss the function of the retina.
11. Describe all the subjective and objective symptoms in paralysis of the third cranial nerve.
12. Discuss the action of the ciliary muscle.

## ANATOMY.

M. W. CONROW, M.D., JUNE 7, 1921.

Answer *ten* only of the following questions:—

1. Give symptoms and ophthalmoscopic appearance of *Retinitis albuminurica*.
2. Give the anatomical structure of the upper lid.
3. Give the anatomical structure of the optic nerve.
4. What is sympathetic ophthalmia?
5. Define trochlea; canthus; caruncula.
6. Name the chambers of the eye and describe their contents briefly.
7. How would you distinguish between absolute glaucoma and mature cataract?
8. Describe pterygium; pannus; symblepharon.
9. Give anatomical differences between a myopic eye and a hyperopic eye.
10. What is blepharitis? What is trichiasis?
11. Describe the ciliary body.
12. Give the anatomical structure of the cornea.

## PRACTICAL OPTOMETRY.

H. C. DOANE, JUNE 8, 1921.

Answer *ten* only of the following questions: —

1. What is ophthalmoscopy? Contrast the two methods in as many particulars as possible.

What are the essentials for success in ophthalmoscopy (*a*) as to apparatus; (*b*) as to procedure?

2. (*a*) Give as many signs and symptoms of hyperopia as you can, and select the three you consider most important.

(*b*) How may we determine the presence of hyperopia? Describe three ways.

3. Describe briefly how you would determine the presence of myopia by means of (*a*) vision; (*b*) symptoms; (*c*) *Punctum proximum*; (*d*) trial lenses.

4. Explain the difference in the following conditions relating to myopia: (*a*) congenital and acquired; (*b*) healthy and dangerous; (*c*) progressive and stationary; (*d*) artificial and accommodative.

5. Describe briefly the principal difference in the symptoms of a condition of hyperopia and one of myopia. Also mention some symptoms that may be common to both.

6. (*a*) If the vertical meridian of the cornea has a radius of 7.8 millimeters and the horizontal of 8.3, what will be the position of the mires of the ophthalmometer at 180 degrees if they are rotated to this meridian after having been set to coincide at 90 degrees?

(*b*) What amount of astigmatism is indicated?

(*c*) Should it be corrected with a plus or minus cylinder, and why?

7. (*a*) In static skiametry with the plane mirror at 26 inches, no movement is found in the horizontal meridian, and a plus .75 D. sph. neutralizes the vertical. Write prescription in three forms.

(*b*) In dynamic skiametry with fixation at 1 M., what is the nature and amount of ametropia when the point of reversal is at 20 inches in the vertical meridian and at 40 inches in the horizontal? What lenses would be required to neutralize this defect?

8. Patient, aged fifty. Examination with the retinoscope (static method after making deduction for your working distance) shows O. D. 2.00 D. hyperopia in the vertical meridian and .50 D. myopia in the horizontal meridian. O. S. 1.75 D. hyperopia in the meridian at 105 degrees and .25 D. myopia in the meridian at 15 degrees. Write prescription for both distance and near glasses.

9. (*a*) Upon what optical principles is the use of the Maddox rod based?

(*b*) What is the relation, if any, of heterophoria to heterotropia?

(*c*) Define and explain two kinds of diplopia.

(*d*) In what position must prisms be placed to ascertain the powers of adduction, abduction, supraduction and infraduction?

10. Specify three methods of aiding weak convergence. Give your working rules that govern you in prescribing prisms. Answer fully.

11. What error of refraction is to be suspected in convergent and in divergent strabismus? What is the rule regarding the strength of the correcting lenses used?

12. Explain in detail your method of making the presbyopic test, and upon what factors you depend for your conclusions in writing the prescription.

#### THEORETIC OPTICS.

S. W. BAKER, JUNE 8, 1921.

Answer all ten questions.

1. As there is a difference in the red and blue wave-lengths, prove how this fact can be demonstrated in a simple, practical way.

2. Give radius of surfaces of a  $-.75 = -.50$  cyl. toric lens.

3. At what two distances from a concave mirror, focal length 15 inches, can an object be placed to produce an image magnified three diameters?

4. An object is 60 inches in front of a convex mirror, radius of curvature 40 inches. What is the relative size (width) of image?

5. If the angles of incidence and refraction are 70 degrees and 39 degrees, respectively, what is the index of refraction?

6. An object is 6 feet in front of a camera lens and it is in focus on the ground glass 8 inches from the lens. What is the power of the lens?

7. A candle flame is between two lenses, A and B; light passing through A is focused on a screen 2 feet away 3 diameters. Light passing through B is focused on a screen 2 feet away 5 diameters. How far apart are the lenses? How far is the candle flame from each lens?

8. If a card is held halfway between a lamp and an opposite wall, how will the area of the shadow compare with that of the card?

9. What are the comparative intensities of light on an object 1 foot, 5 feet and 10 feet away from its source?

10. Give focal length of a convex lens if an inverted image 10 times as long as the object is thrown on a screen 5 feet from the lens?

#### THEORETIC OPTOMETRY.

S. W. BAKER, JUNE 9, 1921.

Answer all ten questions.

1. Draw the telescope tube of an ophthalmometer, showing lenses, etc. Explain their uses.

2. What lenses are always indicated in using the ophthalmometer, and why?

3. What is the fundamental difference between tests made with the Maddox rod or double prism on one hand and the duccion test on the other?

4. In skiametry what two points are conjugate foci?
5. What is symmetrical astigmatism?
6. Of what use is the pinhole disc?
7. Describe your method for testing astigmatism. Do you fully correct, and, if not, under what conditions do you make changes?
8. Who discovered the ophthalmoscope; retinoscope; ophthalmometer?
9. In skiametry, point of reversal at 1 meter, which mirror gives best results, plane or concave?
10. In myopia, what position of the stenopeic slit will show the vertical lines of the clock dial with the least blur?

## PRACTICAL OPTICS.

M. J. FOWLER, JUNE 9, 1921.

Answer all ten questions.

1. In the following prescription supply the left distance lens:

O. D. +.37 sph. = —.87 cyl. axis 75.

Distance:

O. S.

O. D. +1.75 sph. = +.87 cyl. axis 165.

Reading:

O. S. +2.00 sph. = +.62 cyl. axis 35.

2. (a) Explain what one-twelfth 10 K. frame consists of.  
(b) Explain what one-fifth 12 K. frame consists of.  
(c) Explain what 14 K. gold frame consists of.
3. Using spherical lenses only for neutralizing, state which lenses you would use to neutralize the following:  
(a) +.75 cyl. axis 90 = —1.00 cyl. axis 180.  
(b) —1.25 sph. = +1.75 cyl.  
(c) +.62 sph. = +.87 cyl.  
(d) —1.50 sph. = —.37 cyl.
4. (a) Under what conditions would you advise the wearing of Sir William Crookes' "A" shade glass?  
(b) Under what conditions would you advise the wearing of Sir William Crookes' "B" shade glass?
5. (a) Explain two ways of proving that a prescription for a prism is filled accurately with the exact amount of prism.  
(b) How many millimeters would be required to decenter a +3.50 sphere to obtain a 2 degree prism?
6. What curvature must be given to the two surfaces of a wafer to produce a 2.75 diopter reading addition, the distance correction being a +1.25 cylinder, the lenses to be made toric on a +6.00 diopter base curve?
7. (a) How is an ultex lens made?  
(b) How is a kryptok lens made?  
(c) How is a punktall lens made?

8. With the use of a lens measure, the following curves are found. Give the lens values.

(a) Minus surface, 550 D. Plus surface, +6 and +6.75.

(b) Minus surface, 375 D. Plus surface, +6 and +8.00.

(c) Minus surface, 700 D. Plus surface, +6 and +7.50.

9. What is the dioptric value of the following lenses combined? —1.00 sphere = +3.00 cyl. axis 90, +2.00 sphere = +3.00 sphere = +2.00 cyl. axis 180, —1.00 cyl. axis 90 = —4.00 sphere = +.50 cyl. axis 180.

10. Describe crown and flint glass.

(a) What is generally used in the manufacture of spectacle lenses?

(b) When will crown and flint glass fuse?

The Board has during the year maintained high standards in the quality and scope of its examinations, devoting three days to written examinations on technical and practical subjects and one day to practical demonstration. The candidate for registration is required to attain a mark of 65 per cent in each subject. Those failing in one subject only are required to take that one subject again at a subsequent examination. Candidates failing in more than one subject are required to take the full examination in all subjects again. Realizing the importance of a practical working knowledge of the instruments and methods used in the practice of optometry, as well as a theoretic and technical knowledge, the Board requires the candidate to demonstrate the routine procedure of a complete examination of a subject's eyes, using the latest approved instruments and methods. During the year new scientific instruments have been added to the equipment of examination room 181 in the State House.

The Board has been active in investigating reported violations of the optometry law. No prosecutions have been made in the courts, but several offenders have been warned and questionable practices stopped. A scrutiny of the advertising of optometrists has resulted in the elimination of many misleading and untruthful statements. Optometry as a profession is fast being recognized by the public, and the Board is zealous in its efforts to administer the law so that the citizens of this Commonwealth may be protected from the unscrupulous and unethical practitioner. In order that this may be done effectually the Board recommends that a sufficient number of the State police be assigned to the Director of Registration for the purpose of

constant investigation in the various cities and towns of the Commonwealth of all those registered under the optometry law, as well as apprehending violators of the law.

His Excellency the Governor appointed the secretary of the Board as a delegate to the annual meeting of the International Association of Boards of Examiners in Optometry held in New York City in June. The question of educational standards was thoroughly discussed at this meeting by the delegates. It was the sense of the meeting that the apprenticeship clause as included in many of the optometry laws of the States should be eliminated; that all future optometrists should be graduates of an approved optometry school or college. In the support of this sentiment this Board, after careful consideration, has submitted a bill for an amendment to section 68, chapter 112 of the General Laws, and has submitted with the bill concise reasons for the recommended amendment. In compliance with the provisions of section 33, chapter 30 of the General Laws, a copy of this bill has been sent to the Secretary of the Commonwealth.

#### RECOMMENDATION.

Owing to the desirability of raising the educational standards and the fact that applicants for registration who are not graduates of recognized optometry schools find it difficult to pass the examinations given by this Board, and the sentiment prevailing throughout the States that all registered optometrists should be graduates of recognized optometry schools, this Board recommends that section 68, chapter 112 of the General Laws, be amended so as to make it necessary for all applicants for examination and registration to be graduates of an approved optometry school.

The law as it now stands permits a student to secure a student certificate, which permits him to study with a registered optometrist for a period of three years, and he is then eligible to take the examination given by this Board.

This proposed amendment will tend to raise the educational standards and secure higher standards of proficiency for those entering the practice of optometry.

In October His Excellency the Governor appointed George S. Houghton of West Somerville a member of the Board for a term of five years, and he was confirmed by the Council and duly qualified.

At the annual meeting held at the State House, October 11, the Board organized for the ensuing year by re-electing Matthew J. Fowler of Haverhill as chairman and Howard C. Doane of Boston as secretary.

The Board wishes to record its appreciation of the valuable and untiring service of the retiring member, Matthias J. Conrow, M.D., of Springfield.

During the past year 20 men have qualified for registration by examination. Five certificates have been revoked and 1 has been suspended; 2 have retired from practice and 4 have died. There is now a total of 929 registered optometrists in Massachusetts.

## FINANCIAL REPORT.

### *Receipts.*

Unexpended balance in hands of State Treasurer

Nov. 30, 1920 . . . . .	\$1,602 02
Received from applicants for examination . . . . .	650 00
Received from re-examination fees . . . . .	105 00
Received from certificate renewals . . . . .	1,758 00
Received from students' certificates . . . . .	13 00
Received from duplicate certificates . . . . .	10 00
Received from reciprocity fees . . . . .	150 00
Received from fines . . . . .	9 00
Interest . . . . .	12
	<hr/> \$4,297 14



*Expenditures.*

Cash paid for compensation of commissioners	. \$1,900 00	
Cash paid for clerical assistance	. . . . . * 380 01	
Cash paid for car fare and general office expense	. 562 37	
	—————	\$2,842 38
<hr/>		
Unexpended balance in hands of State Treasurer, Nov.		
30, 1921	. . . . .	\$1,454 76

Respectfully submitted,

MATTHEW J. FOWLER, *Chairman.*

HOWARD C. DOANE, *Secretary.*

SAMUEL W. BAKER.

F. JULIUS QUIST.

GEORGE S. HOUGHTON.







The Commonwealth of Massachusetts

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1922

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DIVISION OF REGISTRATION

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



BOSTON

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PUBLICATION OF THIS DOCUMENT  
APPROVED BY THE  
COMMISSION ON ADMINISTRATION AND FINANCE.

## The Commonwealth of Massachusetts

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*To the Honorable Senate and House of Representatives.*

GENTLEMEN: — The Director of Registration in the Department of Civil Service and Registration, Division of Registration, submits herewith the report of the Board of Registration in Optometry, which report is to be published separately from the general report of the Director of Registration.

Respectfully,

W. F. CRAIG,  
*Director of Registration.*

JAN. 1, 1923.





# The Commonwealth of Massachusetts

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## REPORT.

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BOARD OF REGISTRATION IN OPTOMETRY,  
146 STATE HOUSE, BOSTON, MASS., Dec. 29, 1922.

TO WILLIAM F. CRAIG, *Director of Registration.*

SIR:—The Board of Registration in Optometry has the honor to submit to you its eleventh annual report, as required by chapter 700, Acts of 1912.

The Board has held during the year three regular examinations. Forty-nine candidates were examined, including 28 who had taken previous examinations. Of this number, 21 passed and 28 failed. On February 7, 8, 9 and 10, 9 candidates were examined, 8 being candidates for re-examination. Two candidates were successful; 3 passed all subjects but one; 2 failed in more than one subject; 2 failed in re-examination of one subject. On June 19, 20, 21 and 22, 26 candidates were examined, including 7 who had been previously examined; 8 passed and 18 failed; 9 passed all subjects but one; 1 failed in re-examination of one subject; 8 failed in more than one subject. On November 7, 8, 9 and 10, 14 candidates were examined, 13 being candidates for re-examination. Eleven candidates passed and 3 failed; 1 passed in all subjects but one; 2 failed in more than one subject. The following written examination was given June 19, 20, 21 and 22:—

## PHYSIOLOGY AND PHYSIOLOGICAL OPTICS.

DR. QUIST, JUNE, 1922.

Answer all ten of the following questions:—

1. Discuss vision in general and specifically the function of the cones and rods.
2. Describe the connections of a nerve impulse traveling from the retina to the cerebral cortex.
3. Explain how four of Purkinje's images are formed, and from what surface each is reflected.
4. Define identical points of the retina.
5. Discuss judgment of distance and depth.
6. Give the function of the iris. Name the nerves involved in dilatation and in contraction of the pupil.
7. Explain why over-correction is more common in myopia than in hyperopia.
8. Define the following: (a) Esophoria; (b) exotropia; (c) hyperexophoria. Give treatment of each.
9. Is eyestrain more common in a low or in a high degree of astigmatism? Give your reason.
10. Explain fully why the shadow in retinoscopy moves with in hyperopia, against in myopia, faster in one meridian in compound astigmatism.

## ANATOMY.

DR. QUIST, JUNE, 1922.

Answer all ten of the following questions:—

1. Define and locate the following: (a) inner and outer canthus; (b) lachrymal caruncle; (c) plica semilunaris; (d) tendo oculi.
2. Describe the conjunctival sac in a closed eye.
3. How is the uveal tract divided, and what anatomical structure is it composed of?
4. Name the three divisions of the ophthalmic branch of the fifth nerve.
5. Give the location of the lenticular (or ciliary) ganglion. What kind of nerves come from it?
6. Name the layers of the cornea from without in.
7. Define: (a) symblepharon; (b) pinguecula; (c) pterygium.
8. Describe headaches emanating from the eyes. Discuss the causes for such headaches.
9. How would you differentiate between acute conjunctivitis catarrhal and acute conjunctivitis gonorrhoeal?
10. Define exophthalmos. Name three pathological conditions causing same.

## PRACTICAL OPTOMETRY.

MR. HOUGHTON, JUNE, 1922.

1. Give in detail your method of procedure in making an examination of the eyes, and give your reasons for the order in which you use the various instruments and methods.

2. A patient's eye in the 15th meridian is emmetropic and the 105th meridian is 2.50 D. hypermetropic. Where is the point of reversal of each meridian when a  $-.50$  D. lens is placed before the eye?

3. A patient's prescription for O. D. is  $-50 = -25$  cyl. axis 75. What will be the dioptric power of the eye in its two principal meridians, assuming that 58 D. represents emmetropia?

4. To what retinoscope findings at 40 inches would a  $+2.00 = -125$  cyl. axis 90 correspond?

5. Working at a distance of 1 meter, retinoscope findings are  $+1.25$  for the 60th meridian and  $1.75$  for the 150th meridian. What two sphere cylinders may be prescribed?

6. Explain fully the effect of hypermetropia and myopia on the accommodation.

7. Describe the difference between monocular and binocular vision and the fusion sense?

8. What error of refraction would you suspect in using the ophthalmoscope by the direct method with accommodation relaxed if it required  $+2.00$  to get distinct details in the 90th meridian and  $-1.00$  in the 180th meridian, operator requiring  $+1.00$  for his correction?

9. What is meant by retinal fatigue, and how is its existence generally proved?

10. Describe fully the relation between accommodation and convergence.

11. Describe the direct and indirect methods of using the ophthalmoscope, and when are the images formed?

12. In using the ophthalmoscope on a 20. D myopic eye, both direct and indirect methods, which would give best view of the fundus and why?

Answer ten only of the above twelve questions.

## THEORETIC OPTICS.

MR. DOANE, JUNE, 1922.

Answer ten of the following questions: —

1. Explain fully the wave theory of light.

2. What is the solar spectrum? Give the relative wave lengths of its component parts.

3. Explain fully how a body becomes luminous.

4. Define conjugate foci. Give by diagram the location of the conjugate foci of (a) a plus lens; (b) a minus lens; (c) concave mirror.

5. What is meant by index of refraction? What is (a) relative index; (b) absolute index?

6. An oblique pencil of light passes through a lens. Describe *all* optic phenomena which occur. *Illustrate by diagram.*

7. Light from a point 50 cm. distant passes through a plus 1.00 D. sphere and then traverses a distance of 100 cm. and passes through a plus .50 D. sphere. Posterior to the latter 100 cm. is placed a third lens which brings the emergent light to a focus 350 cm. from its starting point. What is the strength of third lens?

8. What kind of a final image will be formed by a plano-convex lens silvered on its plane side when the object is placed in front of the convex surface at twice the radius of curvature?

9. A thin lens having a concave surface of 40 cm. radius and a convex surface of 16 cm. radius has an index 1.52. Where must an object be placed before this lens to cause a real image of twice its size to be formed?

10. What is the object distance for a convex lens of focal distance F if the real image is magnified four diameters?

11. A candle flame is 30 inches from a concave spherical mirror of 10 inches radius. At what distance will its image be formed; will the image be real or virtual, erect or inverted, and what will be its relative size?

12. A lens made of glass of 1.52 index has a dioptric value of plus 6. D. Another lens duplicating the first in form and curvature is plus 7. D. Glass of what index was used to produce the latter?

#### PRACTICAL OPTICS.

MR. FOWLER, JUNE, 1922.

Answer all ten questions.

1. Patient has normal vision for distance and requires O. U. +1.50 sphere for near work. What two forms of lenses would you suggest so he could see objects in the distance without removing his glasses?

2. With the use of a lens measure, the following curves are found. Give the lens values.

(a) Minus surface, 4.75. Plus surface, 6.00 and 7.25.

(b) Minus surface, 6.00. Plus surface, 7.50.

(c) Minus surface, 6.25. Plus surface, 6.00 and 8.00.

(d) Minus surface, 7.75. Plus surface, 6.00.

3. (a) How is a riding frame adjusted if right ear is higher than left ear?

(b) How is an eyeglass adjusted if right side of nose curves out more than left side of nose?

4. Change the following lens powers to equivalent in diopters: (a) 16 inches; 13 inches; 30 inches; 64 inches. Change the following to equivalent in inches: (b) 1.25 D.; 3.50 D.; 5.00 D.; 13.00 D.

5. Describe the following: (a) Noxiol glass; (b) Crookes' glass; (c) Fienzal glass.

6. Transpose the following:—

(a)  $-1.25$  cyl. axis  $60 = +2.25$  cyl. axis  $150$ .

(b)  $+ .75$  cyl. axis  $80 = +1.50$  cyl. axis  $170$ .

(c)  $+2.75$  sphere  $= -1.37$  cyl. axis  $30$ .

(d)  $-.37$  sphere  $= +.87$  cyl. axis  $110$ .

7. (a) How would you re-cement a bifocal lens?

(b) How would you solder a broken bridge?

8. Prescription for distance glasses: O. D.  $+2.00$  sphere  $= +.50$  cyl. axis  $90$ ; O. S.  $+2.50$  P. C. X. Wafers to be added for reading,  $+1.75$  sphere O. U. What would be the curves of wafers?

9. What is the dioptric value of the following lenses combined:  $-50$  sphere;  $+2.00$  cyl. axis  $90$ ;  $-1.00$  sphere;  $+1.50$  sphere;  $+1.00$  cyl. axis  $180$ ;  $-.75$  cyl. axis  $90$ ;  $-2.50$  sphere;  $+.25$  cyl. axis  $180$ ?

10. (a) When prisms are ordered, how would you know that they have been properly ground into the lens?

(b) Prescription reads as follows:—

O. D.  $+2.00$  sphere  $= +1.00$  cyl. axis  $90$ . Decenter in  $4$  m.

O. S.  $+4.50$  sphere  $= +.50$  cyl. axis  $180$ . Decenter in  $4$  m.

What is the amount of each prism?

### THEORETIC OPTOMETRY.

MR. BAKER, JUNE, 1922.

Answer all ten questions.

1. How can you produce  $2\frac{1}{2}\%$  vision in a myope of  $1.50$  D. without concave lenses?

2. What is the angle and strength of a single prism, and what condition would it correct, represented by a  $2\triangle$  base up and a  $7\triangle$  base out before the right eye?

3. What is meant by  $3\frac{1}{3}\%$  vision, and how high would the test type be in mm.?

4. In using the retinoscope it is noted that the pupil of one eye is larger than the other. What does this indicate?

5. In skiametry, under what conditions is a concave mirror preferable?

6. Which position of the stenopeic disc renders the perpendicular lines of the fan dial most distinct in hyperope astigmatism against the rule?

7. In using the ophthalmoscope, direct method, a hyperope of  $3$  D. requires a  $-3$  D. lens to see the fundus clearly. What is the optical condition of the examined eye?

8. With the ophthalmometer, (a) what is meant by primary and secondary positions; (b) how do you determine astigmatism "with the rule" and "against the rule;" (c) has it value as an agent for determining lenticular astigmatism?

9. Explain what is meant by reserve accommodation in presbyopia.

10. Jaeger and Snellen test types. Explain why and how used?

The examinations as in previous years have occupied four days, the first three being devoted to written examinations on theoretic, technical and practical subjects, while the fourth is devoted to practical demonstration of the use of instruments and methods used in the practice of optometry. In the quality and scope of the written examination the Board has during the year maintained very high standards. The practical demonstration required of the applicant has been more comprehensive than in former years. The Board maintains that before issuing a certificate of registration an applicant must demonstrate a practical understanding of the methods, and proficiency in technic with the instruments used. The applicant is therefore required to make a complete routine examination of a subject's eyes, write a prescription, and also demonstrate his ability to properly adjust eyeglasses and spectacle frames. To properly carry out this important feature of the examination, we have submitted a request in our budget estimate for 1923 for further equipment for our examination room, No. 181 in the State House.

The applicant has been required to attain a grade of 65 per cent in each subject. At a recent meeting of the Board, it was voted that the passing grade be made 70 per cent. Those failing in two subjects only are required to take those subjects again at a subsequent examination. Those failing in more than two subjects are required to take the entire examination over again.

The Board, with the efficient aid of the Department of Public Safety, has investigated numerous reports of violations of the optometry law. One prosecution has been obtained and several offenders warned, with the effect of stopping questionable practices. In our report last year this Board recommended that a sufficient number of the State Police be assigned to the Director of Registration for the purpose of constant investigation throughout the Commonwealth of all those registered under the optometry law, and to apprehend violators of the law. We again recommend this as an urgent necessity, as the citizens of this Commonwealth should be protected from the unscrupulous violator of the law as well as the fraudulent unethical practitioner.

His Excellency the Governor appointed the secretary of the Board as a delegate to the annual meeting of the International Association of Boards of Examiners in Optometry, held in Indianapolis, Ind., in June. A report of this meeting was presented to this Board and a copy of the proceedings placed on file. This association has adopted the educational standards outlined at an educational conference held in St. Louis, Mo., in January, 1922, and recommend these standards to the various State boards, to the end that uniform educational standards may be obtained. This Board, after due consideration, adopted these recommendations, and in order to put them in force has submitted bills for amendments to chapter 112 of the General Laws, with the following concise reasons for recommended amendments. In compliance with the provisions of section 33, chapter 30 of the General Laws, copies of these bills have been sent to the Secretary of the Commonwealth.

#### RECOMMENDATIONS.

##### 1. *Educational Standards.*

Owing to the fact that the educational standards for the profession of optometry have been raised to a higher plane throughout the States, and the fact that the examinations given by this Board are of such a high order from a technical as well as practical standpoint, we find that applicants who are not graduates of recognized optometry schools find it difficult to pass the examinations, and that the sentiment prevailing throughout the country is that all registered optometrists should be graduates of recognized optometry schools, this Board recommends that section 68, chapter 112 of the General Laws be amended so as to make it necessary for all applicants for examination and registration to be graduates of an approved optometry school. The law as it now stands permits a person to secure a student certificate, which permits him to study with a registered optometrist for a period of three years or longer, when he is then eligible to take the examination given by this Board.

This proposed amendment will tend to raise the educational standards and secure higher standards of proficiency for those

entering the practice of optometry and be a further protection to the public against incompetency.

There is no provision in the law at present for an established fee to be charged for examination and registration. We therefore recommend that this be incorporated in section 68, chapter 112 of the General Laws.

### 2. *House to House Canvassing.*

There have been many complaints registered with this Board against the prevailing practice of optometrists canvassing and soliciting from house to house as itinerant optometrists. In the opinion of the Board these complaints are justified, as such practice tends to lower the standards of the profession and allows a greater opportunity for the practice of fraud, misrepresentation and deceit.

We therefore recommend that chapter 112 of the General Laws be amended by inserting a new section, making it unlawful to canvass or solicit from house to house as itinerant optometrists.

### 3. *Reciprocity.*

The law now embodies a provision for reciprocity, registering, without examination, optometrists who have passed the required examination in other States whose educational standards are equal to those in this State.

In order to safeguard the public and insure competency on the part of optometrists registered in this manner, we recommend that the law be amended so as to require three years' actual practice in some other State before granting a certificate of registration.

At the annual meeting of the Board, held October 10 at the State House, Matthew J. Fowler of Haverhill was re-elected chairman of the Board for the ensuing year, and Howard C. Doane of Boston was re-elected secretary.

During the past year 21 men have qualified for registration by examination. Two certificates have been revoked and 5 optometrists have died. Two men have been registered by reciprocity. There is now a total of 953 registered optometrists in Massachusetts.



## FINANCIAL REPORT.

*Receipts.*

Unexpended balance in hands of State Treasurer	
Nov. 30, 1921 . . . . .	\$1,454 76
Received from applicants for examination . . . . .	555 00
Received from re-examination fees . . . . .	55 00
Received from certificate renewals . . . . .	1,796 00
Received from students' certificates . . . . .	10 00
Received from duplicate renewal cards . . . . .	1 00
Received from reciprocity fees . . . . .	100 00
Received from fines . . . . .	15 00
Interest . . . . .	10
	<hr/> \$3,986 86

*Expenditures.*

Cash paid for compensation of commissioners . . . . .	\$1,900 00
Cash paid for clerical assistance . . . . .	10 50
Cash paid for car fare and general office expense . . . . .	709 43
	<hr/> 2,619 93

Unexpended balance in hands of State Treasurer Nov.	
30, 1922 . . . . .	\$1,366 93

Respectfully submitted,

MATTHEW J. FOWLER, *Chairman.*

HOWARD C. DOANE, *Secretary.*

GEO. S. HOUGHTON.

SAMUEL W. BAKER.

DR. F. JULIUS QUIST.







The Commonwealth of Massachusetts

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

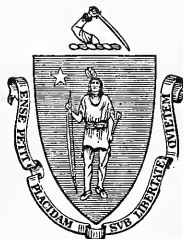
FOR THE

YEAR ENDING NOVEMBER 30, 1923

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DIVISION OF REGISTRATION

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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NOV 27 1923  
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PUBLICATION OF THIS DOCUMENT

APPROVED BY THE

COMMISSION ON ADMINISTRATION AND FINANCE

# The Commonwealth of Massachusetts

## REPORT.

BOARD OF REGISTRATION IN OPTOMETRY,  
146 STATE HOUSE, BOSTON, MASS., Dec. 26, 1923.

TO WILLIAM F. CRAIG, *Director of Registration.*

SIR:—The Board of Registration in Optometry has the honor to submit to you its twelfth annual report, as required by chapter 700, Acts of 1912.

The Board has held during the year two examinations. Fifty-six candidates were examined, including twenty-five who had taken previous examinations. Of this number, 12 passed and 44 failed. On June 5, 6 and 7, 30 candidates were examined, including 4 who had been previously examined; 6 passed and 24 failed; 12 passed all subjects but one; 1 failed in re-examination of one subject; 5 failed in more than one subject. On November 21, 22, 23 and 24, 26 candidates were examined, 21 being candidates for re-examination. Six candidates passed and 20 failed; 6 passed all subjects but one; 2 failed in re-examination of one subject; 12 failed in more than one subject. The following written examination was given June 5, 6 and 7:—

### ANATOMY.

DR. QUIST, JUNE, 1923.

1. Describe the eye-ball and name the muscles which are attached to it.
2. Name the nerves of the eye and state from what part of the brain they originate.
3. Locate and describe the following: (a) Canal of Petit, (b) Vitreous humour, (c) Aqueous humour.
4. From what artery does the arteria centralis retinae come? What part of the eye does it supply?
5. Describe a transverse section of the Optic Nerve showing the relation to its sheath and connective tissue framework.
6. Name and give the location of the glands of the eyelids.
7. Where is the inferior lachrymal gland? Trace the course of the tears from the gland to the inferior meatus.
8. Describe the innermost or nervous coat of the eye. Name its histological layers.
9. Name four varieties of iritis. Give their symptoms, complications and sequelae.
10. What are the subjective and objective symptoms of ulcer of the cornea?
11. Why are immigrants with trachoma excluded from the United States?
12. How would you differentiate between an anterior polar cataract and central opacity of the cornea?

Answer ten only of the above questions.

### PHYSIOLOGY AND PHYSIOLOGICAL OPTICS.

DR. QUIST, NOVEMBER, 1923.

Answer ten of the following questions:

1. How is an image formed on the retina?
2. Give the nervous mechanism of accommodation.

3. Discuss myopia and astigmatism.
4. How do different portions of the retina vary in their power to distinguish color?
5. What are the blind spots, macula lutea and fovea centralis?
6. Discuss the physiological functions of the canal of Schlemm.
7. Give a schematic representation showing the optic pathway from eyes to brain centers.
8. What nerve controls the pupillary reaction? How does this action aid vision?
9. Discuss the changes in the retina under the influence of light.
10. On what does visual acuity depend? What is the smallest visual angle under which an object can be seen?
11. Explain the functions of convergence; how is convergence measured? What causes paralysis of convergence?
12. Describe one simple and one accurate way of examining the visual field.

### PRACTICAL OPTOMETRY.

MR. HOUGHTON, JUNE, 1923.

Answer ten of the following questions:

1. Give in detail your method of procedure in making an examination of the eyes and give your reasons for the order in which you use the various instruments and methods.
2. (a) State how you would use the stenopaic slit in finding the error of refraction in an eye which has astigmatism? (b) Give a prescription.
3. (a) Can the subjective test be made at 10 feet without mirror? Explain fully. (b) Give a convex and concave prescription for constant use.
4. By the dynamic method a  $+2.00$  S. is required to neutralize the motion at 1 meter and a  $+4.25$  S. at 16 inches. What kind of glasses would you recommend and why?
5. Patient 20 years of age shows at 1 meter by the static method an error of  $+2.25$  D. and by the dynamic test made at 16 inches an error of  $+3.75$  D. What glasses would you advise for constant use and why?
6. (a) Describe the direct and indirect methods of using the ophthalmoscope and give the advantage of each. (b) Explain fully how errors of refraction are detected by each method.
7. Describe and draw a diagram of the blood stream as seen with the ophthalmoscope (direct method) in a normal eye, in choked disk and opaque nerve fibres.
8. Describe how you find the relationship existing between the visual axis of the two eyes. Explain each step fully, using diagram.
9. Explain with diagrams a monocular test of the oblique muscles of the right eye.
10. Describe symptoms and causes of clonic and tonic spasm, explaining how you would handle each, especially with school children and presbyopia.
11. Patient 40 years of age has worn a  $+2.00$  cyl. axis 180 for 5 years with comfort, but now complains that reading at night is uncomfortable. How would you handle this case, using 2 pairs of glasses and why?
12. Patient, age 30, bookkeeper, requires O. U.  $+200$  sphere  $= +1.00$  cyl. axis 180, has 8 degree exophoria, 2 degree hyperphoria. What would you do for this case? Discuss your reason.

### THEORETIC OPTICS.

MR. DOANE, JUNE, 1923.

1. An object and its virtual image formed by a concave mirror are 80 cm. apart. When the object is moved 4 cm. further from the mirror it is found the image decreases to  $\frac{1}{3}$  its original size. Determine the focal length of the mirror used.

2. Graphically represent the formation of an image of an object placed before a convex mirror.

3. A thin lens having a concave surface of 40 cm. and a convex surface of 16 cm., respectively, has an index of 1.56. Where must an object be placed before this lens so that it will cause a real image of twice its size to be formed?

4. What kind of a final image will be created by a plano convex lens silvered on its plane side when the object is placed at a distance of twice the radius of the convex surface in front of it?

5. A ray of light incident to a convex spheric refracting surface is 15 mm. from and parallel to the principal axis. The radius of the surface is 30 mm. and the relative index is 1.5. Determine the distance from the pole of the surface to the point of intersection between the refracted ray and the principal axis.

6. Construct to scale the formation of the image of a point 12 mm. above the principal axis and 60 mm. from the plane of a concave spheric mirror whose radius is 30 mm.

7. What is the minimum deviation of a 1.5 glass prism whose refracting angle is 50 degrees?

8. The focal length of a thin lens whose index is 1.5 is 10 cm. when surrounded by air. What is its focal length when immersed in water?

9. At what distance from the floor must a 100 C. P. lamp be placed to give an illumination, on a table, half the intensity of that given by a table lamp which places a 20 C. P. lamp 14" from the table; table 2' 4" high.

10. Show by any method that size of object is to size of image as is: (1) Distance of object to distance of image, measured from pole of mirror; (2) Distance of object to distance of image, measured from center of curvature of mirror; (3) Distance of image from P. F. to F. L. of mirror.

11. Where must we place a ten candle power lamp in relation to a table three feet high, in order to obtain illumination equal in intensity to that given by a 40 candle power ceiling light? Height of room nine feet six inches.

12. Give distance between object and final image, also tell what is position of the latter in respect to the former. Object is forty cm. from plano-convex lens, index of index 1.60 and radius 40 cm., 33 cm. from this is a Bi-concave of index 1.50 and radius 133.3 cm., 14 cm. from this is a Plano-convex index 1.85 and radius 20 cm., 50 cm. from this is a Bi-convex of 12.5 focal length and index 1.40, 25 cm. from this is a Bi-concave of radius 30 cm. and index 1.4875.

Answer ten of the above questions.

## THEORETIC OPTOMETRY.

MR. BAKER, JUNE, 1923.

Answer ten questions only.

1. Which do you consider the most reliable muscle test and why, the double prism or maddox rod?

2. How high should the 20/45 letter be on the Snellen chart?

3. In corneal astigma why isn't the exact findings of the ophthalmometer prescribed?

4. In skiametry under what refractive conditions is the concave mirror preferable?

5. How is ametropia estimated by using the ophthalmoscope, indirect method?

6. Which would see the best on a 6 meter chart, a myope of 1 D. or a hyperope of the same amount. Under what conditions would they see the same?

7. Explain how the stenopaic slit would be used in a case requiring for a correction a +1.00 D = -2 cyl. axis 30 degrees, and state objection to the stenopaic slit.

8. In making a dynamic duetion test at  $\frac{1}{2}$  of a meter how much prism base should a patient fuse?

9. Explain the ciliary duetion test.

10. Why do prisms fail to produce satisfactory results when so clearly indicated with the maddox rod?



11. What is the range of accommodation of a myope of 3 D. whose amplitude is 3 D.?

12. Where is the far point and what condition is an eye with near point 20 cm. and has 5 D. of accommodation?

### PRACTICAL OPTICS.

MR. FOWLER, JUNE, 1923.

1. It is found that it requires a  $+2.75$  D. trial lens to neutralize a given lens in the 180th meridian, and a  $-1.25$  D. trial lens in the 90th meridian.

(a) What would the curves be of the above lens if ground in the toric form ( $-6.00$  D. base.)

(b) A  $+2.00$  D. is to be added for reading. Show the curves on both lenses and wafers if — (1) Ground flat (two forms only); (2) Ground toric (two forms only).

2. Without a lens measure or trial lenses how would you discover a lens to be — (a) a simple sphere; (b) a plano cylinder; (c) a spherocylinder; (d) a plano prism? Show by diagram and explain.

3. Transpose the following into the other two forms. Give rules for transposing each: —

- (a)  $-.50$  sph. =  $+1.25$  cyl. ax. 45.
- (b)  $+4.25$  sph. =  $+.75$  cyl. ax. 90.
- (c)  $+3.50$  cyl. ax. 90 =  $+1.50$  cyl. ax. 180.
- (d)  $-1.50$  sph. =  $-2.00$  cyl. ax. 105.
- (e)  $+12$  sph. =  $+12$  cyl. ax. 10.

4. Explain in detail how you would mark up, cut, edge and drill the following lens for the right eye of a rimless riding bow frame: —  $+1.00$  sph. =  $+37$  cyl. ax. 60.

5. Give rule for decentering, and tell how much a  $+1.00$  D. spherical lens must be decentered to get  $\frac{1}{2}$   $\Delta$  prism and a  $+4.00$  sphere to get  $1\Delta$  prism. (b) Give rules for transposing lenses marked in diopeters into focal lengths in inches, and what is the focal length of these lenses, —  $+22.00$  D. sphere,  $+1.50$  D. sphere and  $+3.75$  D. sphere.

6. A patient has a P. D. of 56 mm. He insists on a zylonite frame and the frame which fits him best has 23 mm. between the lenses. The lenses are to be 38 mm. round. How can this be arranged so that the lenses are correctly fitted?

7. What is the Dioptric value of the following lenses combined: —

- $+1.25$  cyl. ax. 120.
- $-1.25$  cyl. ax. 30.
- $+1.00$  sph. =  $+1.00$  cyl. ax. 120.
- $+2.50$  sph.
- $+1.25$  sph. =  $-.75$  cyl. ax. 30.
- $-.25$  sph. =  $+.50$  cyl. ax. 30.

8. (a) How would you adjust a riding bow frame, if right ear is lower than left ear? (b) How would you adjust an eyeglass if left side of nose curves out more than the right side?

9. (a) If you are using a lens measure adapted for measuring B. & I. glass with an index of 1.523, and are measuring glass having an index of 1.482, would the lens be stronger or weaker than the lens measure indicates? (b) What would be the power of the above lens if the measure indicated  $+400$ ?

10. (a) How does a one-piece bi-focal differ from a Kryptok lens?

(b) Describe how each is ground.

The examinations as in previous years have occupied four days, the first three being devoted to written examinations on theoretic, technical and practical subjects, while the fourth is devoted to practical demonstration of the use of instruments and methods used in the practice of optometry. In the quality and

scope of the written examination the Board has during the year maintained very high standards. The practical demonstration required of the applicant has been more comprehensive than in former years. The Board maintains that before issuing a certificate of registration an applicant must demonstrate a practical understanding of the methods, and proficiency in technic with the instruments used. The applicant is therefore required to make a complete routine examination of a subject's eyes, write a prescription, demonstrate his ability to properly adjust eyeglasses and spectacle frames and to analyze and neutralize ophthalmic lenses.

All applicants are required to attain the grade of 70% as a passing mark in each subject. Those failing in two subjects only are required to take those subjects again at a subsequent examination. Those failing in more than two subjects are required to take the entire examination over again.

The Board with the efficient aid of the Department of Public Safety has investigated numerous reports of violations of the optometry law. No prosecutions have been necessary, but many cases of questionable practice have been effectually stopped. In our report last year this Board again called attention to the need for an investigator for the purpose of constant investigation and vigilance throughout the Commonwealth of all those registered under the optometry law and apprehend violators of the law. We would respectfully again recommend this as an urgent necessity and this Board goes on record as in favor of increasing the annual registration fee of registered optometrists if such is necessary to meet the expense of such an investigator. The citizens of this Commonwealth should be protected from the unscrupulous violator of the law as well as the fraudulent and unethical practitioner. It would also have a strong influence towards maintaining higher ethical standards in the profession.

## RECOMMENDATION.

### *Educational Standards.*

Owing to the fact that the education standards for the profession of optometry have been raised to a higher plane throughout the states, and the fact that the examinations given by this Board are of such a high order from a technical as well as practical standpoint, we find that applicants who are not graduates of recognized optometry schools, find it difficult to pass the examinations and that the sentiment prevailing throughout the country is that all registered optometrists should be graduates of recognized optometry schools, this Board recommends that Section 68, Chapter 112, of the General Laws, be amended so as to make it necessary for all applicants for examination and registration to be graduates of an approved optometry school. The law as it now stands permits a person to secure a student certificate and study privately for a period of three years or longer, when he is then eligible to take the examination given by this Board.

This proposed amendment will tend to raise the educational standards and secure higher standards of proficiency for those entering the practice of optometry and be a further protection to the public against incompetency.

Mr. Walter L. Brown of New Bedford was appointed a member of the Board by Governor Cox on September 19th, confirmed by the Council on September 26th and qualified for office on September 27th.

The Board at this time wishes to express its appreciation of the efficient and painstaking work rendered by Mr. Samuel W. Baker during his services as a member of the Board during the past five years.

At the annual meeting of the Board Matthew J. Fowler of Haverhill was re-elected chairman of the Board for the ensuing year and Mr. Howard C. Doane of Boston was re-elected secretary for the ensuing year.

During the past year 12 men have qualified for registration by examination. Three certificates were revoked and 6 optometrists have died. There is now a total of 956 registered optometrists in Massachusetts.

## FINANCIAL REPORT.

*Receipts.*

Unexpended balance in hands of State Treasurer		
November 30, 1922	\$1,366 93	
Received from applicants for examination . . . . .	750 00	
Received from re-examination fees . . . . .	35 00	
Received from certificate renewals . . . . .	1,820 00	
Received from students' certificates . . . . .	6 00	
Received from duplicate certificates . . . . .	6 00	
Received from reciprocity fees . . . . .	50 00	
Received from fines . . . . .	15 00	
	<hr/>	\$4,058 93

*Expenditures.*

Cash paid for compensation of commissioners . . . . .	\$1,900 00	
Cash paid for clerical assistance . . . . .	30 00	
Cash paid for carfare and general office expense . . . . .	786 31	
	<hr/>	2,716 31
Unexpended balance in hands of State Treasurer November 30, 1923 . . . . .		\$1,342 62

Respectfully submitted,

MATTHEW J. FOWLER, *Chairman.*  
HOWARD C. DOANE, *Secretary.*  
F. JULIUS QUIST.  
GEO. S. HOUGHTON.  
WALTER IRVING BROWN.



The Commonwealth of Massachusetts

ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1924

DIVISION OF REGISTRATION.

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



# The Commonwealth of Massachusetts

## REPORT

BOARD OF REGISTRATION IN OPTOMETRY,  
146 STATE HOUSE, BOSTON, MASS., Jan. 7, 1925.

To WILLIAM F. CRAIG, *Director of Registration*.

SIR:—The Board of Registration in Optometry has the honor to submit to you its thirteenth annual report, as required by Section 67, Chapter 112 General Laws.

The Board has held during the year, three examinations: in February, June and November. The total number of candidates examined was 85. Of this number 32 passed and 53 failed.

The following written examination was given November 18, 19, 20:—

### ANATOMY - PHYSIOLOGY - PATHOLOGY.

H. C. DOANE

Answer three questions from each section and one more from either section to make ten in all.

#### ANATOMY.

1. Name three transparent elements of the human eye. Describe completely the tunics by which each of them are enclosed.
2. Describe the vascular system of the eye.
3. Give the origin, course, insertion and nerve supply of the extrinsic muscles of the eyeball.
4. Does the iris lie in contact with the crystalline lens?

#### PHYSIOLOGY.

1. Discuss the function of the crystalline lens.
2. Discuss the function of the retina, naming the layer where the impression of light is obtained.
3. What are the functions of the meibomian glands, lacrimal glands, conjunctiva.
4. Give the functions of (a) the spaces of fontana (b) tenon's capsule.

#### PATHOLOGY.

1. Discuss Choroiditis—name three varieties, give causes of each and symptoms and describe fully conditions as shown by the ophthalmoscope.
2. Describe fully symptoms and ophthalmoscopic appearances of Hyalitis.
3. Describe fully appearance of the papilla in papillitis as disclosed by the ophthalmoscope.
4. Define (a) Hordeolum (b) Chalazion. How would you differentiate between them?

#### PRACTICAL OPTICS.

M. J. FOWLER.

1. What are the base curves of PCX, PCC, Meniscus Cx. and Ce., and Toric Cx. and Ce.?
2. What would be the curves of the wafers, adding plus 2.00 for near if the distance Rx calls for flat lenses of the following power: O. D.  $+1.00 + 30 \times 90$  and O.S.  $-.50 - .50 \times 180$ ? What would be the curves of the wafers if they were toric lenses?
3. Transpose the following:  
 $a. +2.00\text{sph.} = - .37\text{cyl ax } 40.$   
 $b. -1.00\text{sph.} = +1.25\text{cyl ax } 140.$   
 $c. +.75\text{cyl ax } 90 = -.87\text{cyl ax } 180.$
4. (a) What are the imperfections that may be present in an optical lens?  
(b) What kind of lenses were the first spectacle lenses?

5. Why are toric lenses better for the patient than flat ones?
6. How would you surface grind and polish a wafer from an old plus 1.00 PCX lens, the wafer to go on a Cx Meniscus lens and add plus 1.00 for near vision?
7. Why is the cylinder ground on the inside of a kryptok?
8. What kind of a bridge would you give if a rule held across the nose, where the bridge would come, showed that the eyelashes were set in from the ruler about  $\frac{1}{4}$  inch, and the pupils of the eyes were about  $\frac{1}{4}$  inch below the point where the bridge would come on the front of the nose?
9. Could this Rx be filled correctly? Plus 2.00  $\times$  180, to be 38mm round and decentered in 5mm to get 1 prism diopter effect?
10. Name and illustrate fifteen different forms of lenses.

## PRACTICAL OPTOMETRY.

G. S. HOUGHTON.

Answer ten of the following questions:

1. Patient 22 years of age requires O.D. a + 3.00 Cyl. ax. 135 O. S. a + 400 Cyl. ax. 40 which gives perfect comfort for distance but complains that near work uncomfortable. What would you suspect as the cause? How would you handle the case.
2. Discuss fully your procedure in handling this case. Patient, student 23 years of age complains of inability to fix mind on study or reading, vertigo, drowsiness and general nervous disturbance.
3. Name four of the six generally accepted causes of Heterophoria.
4. Discuss fully your reasons for using the Ophthalmoscope describing both the direct and indirect methods and values of each.
5. Patient age 25 calls for examination. By the usual static method at 1 meter a + 2.50 D. sphere causes reversal of shadow; by the dynamic method at 1 meter a + 1.50 D. sphere and at 16 inches a + 275 D. sphere. What glasses would you advise for constant use?
6. Patient 45 years of age calls for examination. By the usual static method at  $\frac{1}{2}$  meter a + 3.00 D. sphere stops motion: by the dynamic method at 1 meter a + .75 D. sphere and at 16 inches a + 200 D. sphere. What glasses would you advise for constant use?
7. Patient 24 years of age—filing clerk—unable to read names 10 inches above the 180 meridian. What trouble would you suspect and how would you proceed to overcome the difficulty?
8. Patient 32 years of age—teacher—history, frontal and occipital headaches, black specks before eyes and bright light. With plain mirror by the dynamic method a 1 meter O.D. + .50 = - 1.00 Cyl. ax. 75 O.S. + 1.50 = - .75 Cyl. ax. 180. Subjectively O.D. - 1.00 Cyl. ax. 75 O.S. + .50 = - .75 Cyl. ax. 180. Orthophoria at 20 ft. 10° Esophoria at 14 inches. What glasses would you advise for constant use? Discuss your reasons.
9. Patient 12 years of age, student, Anemic, under developed, neurasthenic. History, nervous since birth, unable to do near work wearing O.S. + 3.50 = - 2.00 Cyl. ax. 15 O.S. + 4.50 = - 1.00 Cyl. ax. 180 which gives visual acuity O.D. 20/40 O.S. 20/70. By the dynamic method at 1 meter O.D. + 3.00 = - 2.00 Cyl. ax. 15 O.S. + 3.75 = - 1.00 Cyl. ax. 180. Visual acuity O.D. 20/30 O.S. 20/50. Dynamic method at 16 inches O.S. + 4.50 = - 2.00 Cyl. ax. 15 O.S. + 5.50 = - 1.00 Cyl. ax. 180. Discuss how you would handle this case and give powers and kind of lens for constant use.
10. Patient 30 years of age—Compositor. History, protruding eyes 5mm pupils, poor reflex, tension normal. With plain mirror static method at 1 meter O.D. + 2.00 D. Sphere O.S. + 275 = - 25 Cyl. ax. 165. By dynamic method at 16 inches O.D. + 2.75 Sph. O.S. + 3.50 = - 25 Cyl. ax. 165. 10° Esophoria at 20 ft. 5° Esophoria at 14 in. Discuss how you would proceed in this case and glasses suggested for constant use.
11. (a) Patient 50 years of age, illiterate, able to distinguish colors. Plain mirror at 1 meter dynamic method a + .25 Sph. O.U. at 16 in. dynamic a + 2.00 D. Sph. O.U. What glasses would you advise. (b) Name and describe another test by which you could find the powers of lens required for near work.
12. Patient 55 years of age requires O.U. - 5.75 D. spheres for distance - 2.25 D. spheres for near work. It requires 18° of prism base out to fuse

light at 20 ft., and  $14^\circ$  prism to fuse at 12 in. What prescription would you recommend for constant use, using one pair of glasses.

### THEORETIC OPTICS.

W. I. BROWN.

1. Describe:—
  - (a) Regular reflection.
  - (b) Diffuse reflection.
  - (c) Rectilinear propagation of light.
2. What do the following terms indicate?
  - (a) Absolute index of refraction.
  - (b) Relative index of refraction.
3. What determines the velocity of light in a given medium?
4. (a) How is the wave length of light determined?  
 (b) How is the frequency of the undulations determined?
5. Define the following and draw a diagram locating the same:
  - (a) The Focal planes and Focal points.
  - (b) The Principal planes and the Principal points.
  - (c) The Nodal planes and the Nodal points.
6. State Law of Refraction.
7. When a convergent lens is placed in front of an emetropic eye, where must an object be situated so that it will be seen without accommodation?
8. Describe Polarization of light.
9. Give an explanation of Fraunhofer's lines in the solar spectrum.
10. If a  $+6.50$  D. lens be moved from a position 11mm. in front of a given plane to 18mm. in front of that plane, what will be the change in its effective power?
11. Determine the oblique power of a  $10^\circ$  prism at  $45^\circ$ .
12. Describe briefly what is necessary under the following headings to obtain best visual acuity, comfort and efficiency:
  - (a) Definition.
  - (b) Size.
  - (c) Illumination.
  - (d) Contrast.
  - (e) Stray light.

### THEORETIC OPTOMETRY.

S. W. BAKER.

Answer ten questions only.

1. What are the points of resemblance, also difference between a case of spasm of accommodation and a case of myopia?
2. What is mixed astigmatism, describe best methods of testing such a case.
3. How does presbyopia differ from acquired hyperopia.
4. State some reasons why opthalmometer readings cannot always be relied upon.
5. What is the difference between an amblyopic and an asthenopic eye.
6. In what way does fusion differ from binocular single vision.
7. Which has the most fully developed of accommodation, the myope or the hyperope, state reasons.
8. In muscle anomalies which is the most important to correct  $5^\circ$  of esophoria,  $5^\circ$  of exophoria, or  $5^\circ$  of hyperphoria, state reasons.
9. Why is it necessary to measure the amplitude of accommodation and convergence, explain your methods.
10. Explain symmetrical astigmatism.
11. What is meant by dominant and non-dominant eye.
12. What would be the size of letters for a person to see that has  $2/5$ ,  $3/10$  or  $1/3$  vision.

The examinations as in previous years have occupied four days, the first three being devoted to written examinations on theoretic, technical and practical subjects, while the fourth is devoted to practical demonstration of the use of instruments and methods used in the practice of optometry. In the quality and scope of the written examination the Board has during the year maintained



very high standards. The practical demonstration required of the applicant has been more comprehensive than in former years. The Board maintains that before issuing a certificate of registration an applicant must demonstrate a practical understanding of the methods, and proficiency in technique with the instruments used. The applicant is therefore required to make a complete routine examination of a subject's eyes, write a prescription, demonstrate his ability to properly adjust eyeglasses and spectacle frames and to analyze and neutralize ophthalmic lenses.

All applicants are required to attain the grade of 70 per cent as a passing mark in each subject. Those failing in two subjects only are required to take those subjects again at a subsequent examination. Those failing in more than two subjects are required to take the entire examination over again.

The Board, with the efficient aid of the Department of Public Safety, has investigated numerous reports of violations of the optometry law. No prosecutions have been necessary, but several cases of questionable practice have been effectually stopped.

In our annual reports of 1922 and 1923 the Board made specific recommendations for changes in the law to require that all applicants for examination and license shall be graduates of recognized and approved optometry schools, and that investigators be provided the Division of Optometry for the purpose of regular and constant investigation and vigilance throughout the Commonwealth for all those registered under the Optometry law and to apprehend violators of the law. Bills containing provisions for these recommendations were submitted with our reports. No action was taken by the Legislature.

The Board is strongly of the opinion that certain changes in the law should be made and respectfully submit in this report the following letter which was sent to the Joint Legislative Committee appointed by the last General Court to investigate all matters relating to the department of Registration, and which definitely states what we believe to be necessary changes:

"August 18, 1924.

HON. EBEN S. DRAPER, *Chairman*.

Special Committee on Registration Laws,

Room 448, State House,

Boston, Massachusetts.

DEAR SIR:—In compliance with your request, it gives me pleasure to submit herewith, as concisely as I am able the remarks I made to your committee on Wednesday, August 13th. Let me first express my appreciation of the courtesy and attention given me at that time by your committee.

The Optometry Board has been functioning in this Commonwealth since 1912. This law was passed by the Legislature for the purpose of regulating the practice of Optometry and for the protection of the public against incompetency. At the present time every state in the Union, together with the District of Columbia have similar laws defining the practice of Optometry, and providing for the examination and registration of this class of practitioners.

The law as originally passed in this Commonwealth, provided that the fee for examination and registration should be \$25.00. When certain amendments were made to the law in 1920, the stipulation of the fee was inadvertently omitted. The Board feels that this should be re-incorporated in the law and would suggest that this be done. The fee for registration by Reciprocity as now defined in the law is \$50.00. We believe that this is fair and should remain as it is. The law also requires an annual registration, and if in the opinion of your committee it seems advisable to recommend an increase in the amount of the annual registration fee, it would meet with the approval of our Board.

Since 1912, the educational standards both as to preliminary and professional requirements have been raised materially. The law now states that an applicant for registration must have four years' high school education or its equivalent. The equivalent to be determined by the Board by examination in high school subjects. The matter of determining the equivalent of a high school education is a very difficult problem. Our Board has had the advice and help of the Department of Education in this particular phase of our work. When it has

been found necessary to give an examination to determine an applicant's high school qualifications it has been the custom to use the Entrance examinations to the State Normal School. This has not been entirely satisfactory. Our Board would suggest that the law be changed so as to eliminate the word "equivalent" and that the applicant be required to furnish a statement from the Department of Education that he has the required four years' high school education.

As to Professional educational standards, the law now requires an applicant for registration to be a graduate of an Optometry school or College approved by the Board, which maintains a course of study of not less than two years, and of one thousand attendance hours. Our Board feels that a two year course of special training is a minimum for the proper training, but would respectfully call your attention to the fact that several Optometry schools are providing three and four year courses, indicating that the demands of higher education are increasing. The question of rating the professional schools should be done by some agency which has properly trained men to judge from an educational standpoint, all phases of a school or college, which includes its quarters, its equipment, its curriculum, the number of teachers for the number of students enrolled, the personal qualifications of the teaching staff, also the educational attainments of this staff; the completeness of laboratory equipment and clinical facilities.

It might be of interest to your committee to know that in 1921, through the International Association of Boards of Examiners in Optometry, of which organization I was Secretary at the time, an educational conference was held in St. Louis. It was attended by representatives of the Board of Examiners, also from the Federation of Optometry schools and from the National Organization of Optometrists. As a result of this conference there was drafted an outline of what should constitute a Class A Optometry school. A copy of the report of this conference containing this outline I am glad to submit herewith, hoping that it may be of interest to you. It is also interesting to note that as a result of the adoption of this outline of a Class A school by the International Association of Boards, the various schools of the country have voluntarily increased their standards with the result that many of the States are now recognizing only those schools which meet these standards. There is also a Permanent committee in the International Association whose duty is to scrutinize the various schools of the Country and report each year to the Association.

The law as it now stands in this Commonwealth gives our Board the power to approve Optometry schools. We believe it would be wise to leave this as it is, but, if in the opinion of your Committee this is unwise we would suggest that the words "approved by the State Department of Education" be used instead. There is no doubt but that the Department of Education would have access to the various agencies that have the means of investigating and classifying various professional schools.

There is a clause in our law which also permits a person to register with the Board as a student, and then pursue the study of Optometry with some registered Optometrist. After a minimum of three years of such study, he may make application for registration. It has been the experience of the Board that such provision is unwise, as under the present day standards, it is quite impossible for the student to obtain the necessary technical knowledge without having access to complete laboratory equipment and clinical facilities. This has been demonstrated with the students who have come before our Board enrolled under this clause and been unable to pass the examinations. It thus imposes a hardship on the student and it would be much fairer not to hold out opportunities of this kind. We would suggest the elimination of the "Student's clause," making it necessary for an applicant to be a graduate of an approved Optometry School.

There have been for a number of years repeated complaints of incompetent itinerants. As a result of sentiments expressed by Optometrists throughout the State, as well as laymen, our Board in our Annual Report of 1922, recommended an amendment to Chapter 112 of the General Laws, to make it unlawful to canvass or solicit from house to house as an Itinerant Optometrist. We would submit this recommendation to your Committee, believing it sound.

Another important matter, we would ask your careful consideration; in the opinion of the Board, we feel that the sale of eye-glasses and spectacles

containing lenses for the correction of defective eye sight being sold over the counter as merchandise, is bad practice and should be made unlawful. This view is held by many laymen and in 1923, as evidence of this sentiment, a bill was introduced in the Legislature to make this unlawful. We would suggest that this should be done and should also include a provision that broken lenses can only be replaced by registered Optometrists, as there are many evidences of mistakes being made by incompetent jewelers and others by reason of their inability to accurately analyze lenses, wrong lenses being thereby substituted acting as an injury to the wearer.

The above suggestions are frankly made as a result of actual experience in administration of the law, and we respectfully submit the same for the consideration of your Committee.

Our Board desires to co-operate in every way possible, and would place at your disposal any records or data in our possession that you desire.

Respectfully yours,

(Signed) HOWARD C. DOANE,

*Secretary.*

These suggestions if put into effect by law or provided for by rule will tend to raise the educational standards and secure higher standards of proficiency for those entering the practice of Optometry, and be a further protection to the public against incompetency.

The Board respectfully asks that more commodious accommodations be provided for our records and files, the space now used being inadequate and congested.

In September, His Excellency, Governor Cox appointed Mr. Samuel W. Baker of Rockland a member of the Board to succeed Dr. F. Julius Quist of Worcester whose term expired.

The Board desires to express its appreciation of the highly valuable service rendered by Dr. F. Julius Quist during the past five years as a member of the Board.

At the annual meeting of the Board, Matthew J. Fowler of Haverhill was re-elected chairman of the Board for the ensuing year, and Howard C. Doane of Boston was re-elected secretary for the ensuing year.

During the past year 32 men have qualified for registration by examination; 3 registered by reciprocity. Four certificates were revoked and one optometrist died. There is now a total of 983 registered optometrists in Massachusetts.

#### FINANCIAL REPORT.

##### *Receipts*

Unexpended balance in hands of State Treasurer, November 30, 1923	\$1342.62
Received from applicants for examination .....	725.00
Received from re-examination fees .....	160.00
Received from certificate renewals .....	1816.00
Received from students' certificates .....	3.00
Received from duplicate certificates .....	10.00
Received from reciprocity fees .....	150.00
Received from High School examinations .....	10.00
Received from certified statement .....	1.00
	<hr/>
	\$4217.62

##### *Expenditures*

Cash paid for compensation of commissioners.....	\$1900.00
Cash paid for clerical assistance .....	45.00
Cash paid for carfare and general office expense.....	398.85
	<hr/>
	\$2343.85
Unexpended balance in hands of State Treasurer November 30, 1924 .....	\$1873.77

Respectfully submitted,

MATTHEW J. FOWLER, *Chairman.*

HOWARD C. DOANE, *Secretary.*

WALTER I. BROWN.

GEO. S. HOUGHTON.

SAM'L W. BAKER.



**The Commonwealth of Massachusetts**

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**ANNUAL REPORT**

OF THE

**BOARD OF REGISTRATION IN OPTOMETRY**

FOR THE

**YEAR ENDING NOVEMBER 30, 1925**

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**DIVISION OF REGISTRATION**

**DEPARTMENT OF CIVIL SERVICE AND REGISTRATION**



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# The Commonwealth of Massachusetts

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## REPORT

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BOARD OF REGISTRATION IN OPTOMETRY,  
STATE HOUSE, BOSTON, MASS., December 29, 1925.

TO WILLIAM F. CRAIG, *Director of Registration.*

Sir:—The Board of Registration in Optometry has the honor to submit to you its fourteenth annual report, as required by Section 67, Chapter 112 General Laws.

The Board has held during the year, two examinations: in June and November. The total number of candidates examined was 59. Of this number 25 passed and 34 failed.

The following written examination was given June 23, 24, 25:—

### ANATOMY — PHYSIOLOGY — PATHOLOGY

Answer three questions from each section and one more from either section to make ten in all.

#### ANATOMY

1. Name and describe the five layers of the Iris.
2. Give as completely as possible the blood and nerve supply of the uvea.
3. Name the extrinsic muscles and give definitely the nerve supply of each.
4. Make schematic drawing of visual and pupillary nerve paths. Locate Optic Chiasm, Ciliary Ganglion, Primary Optic Ganglion, Optic Radiations.

#### PHYSIOLOGY

1. Give the functions of the following: Schlemm's Canal, Hyaloid Canal, Choroid, Sclerotic and Hyaloid Membrane.
2. Why must there be perfect transparency of the retina and absence of vessels in the region of the macula?
3. What are the functions of eyelids? Discuss fully.
4. Tell what you know of the relations of the fluorescence of the rods in the retina to the visual purple.

#### PATHOLOGY

1. Discuss fully the venous and arterial pulse. Explain reasons for each and which is regarded as always pathological.
2. Describe ophthalmoscopic appearance of fundus in the following conditions: (a) Arteriosclerosis (b) Diabetes (c) Nephritis.
3. What etiological conclusions can be drawn from the Ophthalmoscopic picture of an Optic Neuritis?
4. Discuss Glaucoma, giving causes and both subjective and objective symptoms.

H. C. DOANE.

June, 1925.

### PRACTICAL OPTOMETRY GEORGE S. HOUGHTON

Answer ten of the following questions.

1. Give in complete detail your method of procedure in making an examination of the Eyes, and give your reasons for the order in which you use the various instruments and methods.
2. Patient 60 years of age, paper hanger, comes for examination; History, dizziness; working at 20 inches with plane mirror by the usual static method. it required a + 2.00 D Sphere to cause reversal at 16 inches; by the Dynamic method a + 4.75 D Sphere, Right Eye adduction 8° abduction 2° superduction 0, subduction 3°, muscle of left eye normal. What would be your correction for constant use? Explain fully.

3. How many diopeters of accommodation are required for an Emmetropic Eye to see clearly an object at 20 feet?

4. Patient 40 years of age, housewife, comes for examination; History, frontal and occipital headaches, 3 months since having meager operation; general condition good. With plane mirror by the usual static method  $+2.50 = -.50$  Cyl. axis 180 is required O.U. by the Dynamic method at 16 inches  $+3.75 = -.50$  Cyl. axis 180 O.U.  $8^\circ$  Esophoria at 20 feet, using the maddox rod,  $3^\circ$  Exophoria at 14 inches using a  $6^\circ$  prism base up over the left Eye. Discuss fully how you would handle the case and give correction for constant use.

5. (a) What sense alone dominates every independent action of the extrinsic muscles?

(b) Under what conditions does this sense refuse to function? Discuss fully.

6. Discuss fully when a full correction for hypermetropia is suggested and under what circumstances is it reduced?

7. (a) Describe four methods of testing for astigmatism.

(b) Name and describe four methods of testing the muscles at 16 inches.

(c) Why is the maddox rod test unreliable?

8. Discuss fully the direct and indirect methods of using the Ophthalmoscope, explaining in detail the value of each in Optometric practice.

9. Patient, 25 years of age, bookkeeper, comes for examination; History, work blurs at times; requires for a correction  $+2.00$  D Sphere O.U. Right Eye adduction  $24^\circ$ , abduction  $6^\circ$ , subduction  $1\frac{1}{2}^\circ$ , superduction  $3^\circ$ . Discuss your reasons for his trouble and give correction for constant use.

10. (a) Discuss your procedure in making a Monocular test of the lateral and vertical balance of the muscles of the Right Eye.

(b) If a prism correction is suggested, on which eye would you place it?

(c) How do you proceed to find the independent power of each of the Recti muscles?

11. Patient 30 years of age, Engraver, requires  $+2.50$  D Sphere O.U. has  $8^\circ$  Esophoria at 20 feet and  $18^\circ$  Exophoria at 14 inches. What correction would you give for constant use? Discuss your reasons.

12. (a) Explain how you measure the amplitude of accommodation, giving two examples.

(b) Discuss each of two ways you can find the amplitude of convergence.

## PRACTICAL OPTICS

M. J. FOWLER

1. (a) Rx. calls for a  $+.50$  sphere combined with a 2 dioptre prism base out. How would you find out if the lens was correctly ground, if it were delivered to you all mounted?

(b) What is the rule of decentration of lenses?

2. (a) State your procedure in grinding and mounting a pair of toricryptoks in a rimless mounting.

(b) Describe four double vision lenses and how each is made.

3. (a) The lower edge of a spectacle bridge cuts the nose; how would you remedy it?

(b) Give the letters signifying the length of the shank of the bridge you would give to a person with a prominent nose and deep set eyes; also to a person with a flat nose and prominent eyes.

4. (a) By mistake a wafer is cemented to the cylinder side of a flat lens. What happens to the power of the reading portion of the lens?

(b) A patient drops an oval flat lens from his nose glass and puts it back with the cylinder on the wrong side. What change is there in the effect of the lens?

(c) How would you find the focus of a sphere in three ways?

5. (a) What causes a rainbow in a cement bifocal?

(b) Are cemented wafers ever put on the outside of a lens? Why?

(c) When mounting a lens which side goes nearest the eye? Why?

6. The centers of each lens of a pair of + 6. spheres are two M.M. out from the centers of the pupils. They are in a gold filled frame. Would you grind new lenses and decenter?

7. (a) Rx. calls of  $-.50 = -.50 \times 180$  add + 2. for near. How would you surface and polish same if it were a cement bifocal?

(b) How would you decenter a + 3. combined with a + 2.  $\times 90$  so as to get a 1.50 dioptre prism?

8. (a) How is Crookes A glass distinguished from ordinary optical lenses?

(b) How is a pebble lens different from an ordinary optical lens?

9. (a) What is the base curve of a toric lens?

(b) Why is a toric better than a flat lens?

(c) What is the advantage of a lenticular lens?

10. (a) The right lens of a finger piece mounting sets too high on patient's face. How would you lower it?

(b) How do you use an axometer?

(c) How do you use a protractor?

### THEORETIC OPTICS

W. I. BROWN

Answer ten of the following twelve questions.

1. The refracting angle of a prism is  $2^\circ 30'$ .

The index of refraction is 1.5.

Find the power.

2. Two prisms designated A and B of 5 prisms dioptre power are superimposed with their base apex lines A axis 35 B axis 155.

What single prism power would equal the above combination and at what axis would its base apex line lie?

3. If the resolving power of an eye should be  $\frac{1}{2}$  mm. of are at what distance can a black object 30 cm. in diameter be seen on a white background properly illuminated? Answer in cm.

4. Give formula for determining number of images formed when two plane mirrors are mutually inclined; and explain.

5. A ex and cc lens each of 25 cm. focal length are placed coaxially 7.5 cm. apart. Find the position of the image. (state in cm.) (a) If the object is 37.5 cm. beyond the ex lens. (b) If the object is 37.5 cm. beyond the cc. lens.

6. If a crystalline lens was removed from a normal eye where would the second focal point be located?

7. What are actinic rays and where found in spectrum?

8. Explain how to arrange two ex lenses of 23 inches and 1 inch focal length respectively to form a telescope. Draw diagram showing passage of pencil of rays, coming from infinity, through the telescope.

9. What rays can be said to cause light only and where located in the spectrum?

10. What is the wave theory of light?

11. Show by geometrical construction where the focal point of a spherical mirror lies.

12. How far from a cc. mirror that has a focal length of 45 cm. must an object be placed in order to have the image inverted and three times as large as the object?

### THEORETIC OPTOMETRY

S. W. BAKER

Answer ten questions only.

1. How would you determine and differentiate between presbyopia and accommodative asthenia?

2. Discuss three kinds of asthenopia.

3. What is the object of Ocular Calisthenics?

4. Strabismus, (a) do both eyes deviate? (b) is diplopia present (c) is



the false image seen in the same direction as eye deviates; (*d*) can it be corrected with prisms; (*e*) is it caused by fright, convulsions or mental impressions.

5. The Amblyscope, its construction and utility.

6. Discuss the version test, version anomalies and version exercises.

7. Name two methods to stimulate ocular muscles and describe each.

8. Ophthalmoscope, indirect method, using + 13 objective lens, patient is 4.D. hyperopic. How much accommodation would you use working at 12" away to get a clear view of the fundus?

9. Discuss cross-cylinder test in Myopia, Hyperopia and Presbyopia.

10. Discuss methods in making static and dynamic skiometry test using plane and concave mirrors.

11. On what four conditions does visual acuity depend?

12. Discuss the use of the transilluminator.

The examinations as in previous years have occupied four days, the first three being devoted to written examinations on theoretic, technical and practical subjects, while the fourth is devoted to practical demonstration of the use of instruments and methods used in the practice of optometry. In the quality and scope of the written examination the Board has during the year maintained very high standards. The practical demonstration required of the applicant has been more comprehensive than in former years. The Board maintains that before issuing a certificate of registration an applicant must demonstrate a practical understanding of the methods, and proficiency in technique with the instruments used. The applicant is therefore required to make a complete routine examination of a subject's eyes, write a prescription, demonstrate his ability to properly adjust eyeglasses and spectacle frames and to analyze and neutralize ophthalmic lenses.

All applicants are required to attain the grade of 70 percent as a passing mark in each subject. Those failing in two subjects only are required to take those subjects again at a subsequent examination. Those failing in more than two subjects are required to take the entire examination over again.

The Board, with the efficient aid of the Department of Public Safety had investigated numerous reports of violations of the optometry law. No prosecutions have been necessary, but several cases of questionable practice have been effectually stopped.

The Board is strongly of the opinion that certain changes in the law should be made and respectfully submit in this report the following recommendations:

## RECOMMENDATIONS

### Educational Standards

Owing to the fact that the educational standards for the profession of optometry have been raised to a higher plane throughout the States, and the fact that the examinations given by this Board are of such a high order from a technical as well as practical standpoint, we find that applicants who are not graduates of recognized optometry schools find it difficult to pass the examinations, and that the sentiment prevailing throughout the country is that all registered optometrists should be graduates of recognized optometry schools, this Board recommends that section 68, chapter 112 of the General Laws be amended so as to make it necessary for all applicants for examination and registration to be graduates of an approved high school and an approved optometry school. The law as it now stands permits a person to secure a student certificate, which permits him to study with a registered optometrist for a period of three years or longer, when he is then eligible to take the examination given by this Board.

This proposed amendment will tend to raise the educational standards and secure higher standards of proficiency for those entering the practice of optometry and be a further protection to the public against incompetency.

There is no provision in the law at present for an established fee to be charged for examination and registration. We therefore recommend that this be incorporated in section 68, chapter 112 of the General Laws.

### Reciprocity.

The law now embodies a provision for reciprocity, registering, without examination, optometrists who have passed the required examination in other States whose educational standards are equal to those in this State.

In order to safeguard the public and insure competency on the part of optometrists registered in this manner, we recommend that the law be amended so as to require three years' actual practice in some other State before granting a certificate of registration.

### House to House Canvassing.

There have been many complaints registered with this Board against the prevailing practice of optometrists canvassing and soliciting from house to house as itinerant optometrists. In the opinion of the Board these complaints are justified, as such practice tends to lower the standards of the profession and allows a greater opportunity for the practice of fraud, misrepresentation and deceit.

We therefore recommend that section 70, chapter 112 of the General Laws be amended, making it unlawful to canvass or solicit from house to house as itinerant optometrists.

### Certificates to be Returned.

In order to make it less possible for one other than the rightful holder of a certificate of registration, to practice optometry, it is desirable that all certificates that have been revoked should be returned to the Board.

### Sale of Glasses as Merchandise.

Many complaints come to the Board of the selling of eyeglasses as merchandise without examination. Great injury is done many persons in this practice and we strongly recommend that the clause in Section 73 which permits the sale of merchandise from permanently located and established places of business except on prescription of Physicians or Surgeons, or from Optometrists be eliminated so that all persons dispensing eyeglasses, spectacles, or lenses shall be properly licensed.

In order to conduct the examination for candidates, particularly in the Practical Demonstration required, it is necessary to have proper instruments and other equipment and such equipment needs replenishment and addition from time to time. We therefore recommend that the annual license fee be increased from two dollars to five dollars which will furnish sufficient funds to cover additional expenses.

These proposed amendments will tend to raise the educational standards and secure higher standards of proficiency for those entering the practice of Optometry, and be a further protection to the public against incompetency.

The Board respectfully asks that more commodious accommodations be provided for our records and files, the space now used being inadequate and congested.

In September, His Excellency, Governor Fuller reappointed Mr. Matthew J. Fowler of Haverhill, for a term of five years.

At the annual meeting of the Board, Mr. Howard C. Doane of Boston, was elected Chairman of the Board for the ensuing year, and Mr. George S. Houghton of Somerville, was elected Secretary for the ensuing year.

During the past year 25 men have qualified for registration by examination; 1 registered by reciprocity. Three certificates were revoked, one certificate suspended, and one Optometrist died. There is now a total of 1,004 registered optometrists in Massachusetts.

## FINANCIAL REPORT

*Receipts*

Unexpended balance in hands of State Treasurer, November 30, 1924.	\$1873.77
Received from applicants for examination .....	575.00
Received from re-examination fees .....	115.00
Received from certificate renewals .....	1,864.00
Received from Students' Certificates .....	4.00
Received from High School examinations .....	5.00
Received from Reciprocity fees .....	50.00
	<hr/>
	\$4486.77

*Expenditures*

Cash paid for compensation for commissioners .....	\$1900.00
Cash paid for clerical assistance .....	60.00
Cash paid for earfare and general office expense .....	375.81
	<hr/>
	\$2335.81
Unexpended balance in hands of State Treasurer, November 30, 1925 .....	\$2150.96

Respectfully submitted,

HOWARD C. DOANE, *Chairman.*  
 GEORGE S. HOUGHTON, *Secretary.*  
 SAMUEL W. BAKER.  
 WALTER I. BROWN,  
 MATTHEW J. FOWLER.



The Commonwealth of Massachusetts

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1926

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DIVISION OF REGISTRATION

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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# The Commonwealth of Massachusetts

## REPORT

BOARD OF REGISTRATION IN OPTOMETRY  
STATE HOUSE, BOSTON, MASS., January 5, 1927.

To WILLIAM F. CRAIG, *Director of Registration*.

SIR:—The Board of Registration in Optometry has the honor to submit to you its fifteenth annual report, as required by Section 67, Chapter 112 General Laws.

The Board has held during the year, two examinations; in June and November. The total number of candidates examined was 58. Of this number 21 passed and 37 failed.

The following written examination was given June 8, 9, 10 and 11:

### ANATOMY

1. Describe the Capsule of Tenon. Give its connection with the extrinsic muscles.
2. Trace the ophthalmic nerve. What does it supply?
3. Describe the lachrymal gland and its ducts.
4. Describe the Iris and give its blood and nerve supply.

### PHYSIOLOGY

1. What is the function of the crystalline lens? Describe its action.
2. What is the function of the visual purple? Where is it found?
3. State the function of (a) the internal recti; (b) the external recti; (c) the superior oblique.
4. What is the function of the Canal of Schlemm?

### PATHOLOGY

1. Describe the appearance of a retinal hemorrhage.
  2. What are the symptoms of (a) Iritis; (b) cyclitis; (c) conjunctivitis?
  3. Discuss the symptoms of Glaucoma.
  4. What is meant by Argyll-Robertson Pupil?
- June, 1926.

HOWARD C. DOANE.

### PRACTICAL OPTOMETRY

Answer ten questions only.

1. Patient, clerk 40 years of age; history, pain around left eye, general health poor, nervous, tires easily. Subjective findings O. D. — .25 cyl ax 20. O. S. + .50 = — .25 cyl ax 180. Dynamic at  $\frac{1}{2}$  metre O. D. + 200 = — .25 cyl ax 10. O. S. + 2.25 = — 50 cyl ax 180, 9° Exo. at 13 in. P.P. 9 inches, Reserve fusion convergence, at 13 in. Positive 16, negative 22. Write a prescription for constant use, explain your reasons for same.
2. Patient 64 years of age, general health poor. History, sees two objects, unable to do close work. Dynamic findings at 14 inches O. D. + 4.00 O. S. + 4.25 Subjective O. D. + 1.50 O. S. + 1.75 has 5° Eso. and 9° left Hyper. at 20 ft., 8° Exo. and 5° left Hyper. at 14 in. Explain fully how you would handle the case and power of lenses for constant use.
3. Patient 46 years of age, general cook. History, eyes tire both for distance and near work. Dynamic findings at 14 inches O. D. + 3.75 = — 25 cyl x 90. O. S. + 3.50 sphere. Trial case for distance O. D. + 1.25 = 1.25 cyl x 90 O. S. + 1.00 sphere. Tonicity at 20 ft. 3° Eso and 2½° Right Hyper. Prism and dot test at 14 in. 4° right Hyper. and 5½°

Exo. Explain how you would handle this case and power of lenses used.

4. Discuss fully the various methods you would use to examine the eyes of an illiterate 47 years of age, vision without glasses o.u. 20/70. Write a prescription of your findings using Ultex lenses.

5. Describe a monocular test of the lateral and vertical muscles of the left eye. Give in detail your procedure.

6. Patient, salesman, age 52 years. History, dizziness, unable to do near work. With plain mirror Static method at 1 metre motion is neutralized in O. D. with  $+4.75 = -250$  cyl ax 15 O. S.  $+225 = -50$  cyl ax 180 has  $1^\circ$  right Cat. and  $12^\circ$  Exo at 20 ft. Write a prescription for constant use and give your reasons for same.

7. Patient salesman, age 48 years. History, eyes tire and ache in driving auto. Subjective examination shows error for distance O. D.  $-4.25 = -.50$  cyl ax 90. O. S.  $+150 = -.50$  cyl ax 90  $= +1.75$  add for near has  $5^\circ$  left Hyper. and  $2^\circ$  Eso at 20 ft.  $8^\circ$  left Hyper. and 8 Exo. at 14 inches. Write a prescription for constant use and give your reasons for same.

8. Patient student, age 18 years. History, eyes tire and blur for near work. Vision without glasses O. D. 20/30 O. S. 5/200. Dynamic skia. at 14 inches O. D.  $+250 = -25$  cyl ax 90 O. S.  $+7.50$  sphere. Subjective O. D.  $+150 = -25$  cyl ax 90 O. S.  $+600$  sphere. Vision 20/20 O. S. 15/200. Ophthalmoscope shows an undeveloped left eye. Explain how you would handle this case.

9. a) How is the total amplitude of convergence obtained at any point of fixation?

b) Give an example with fixation at 16 inches.

10. Discuss how you estimate the refractive error with the ophthalmoscope by the direct method.

11. Name and explain fully three methods of measuring an eye with plain mirror by static retinoscopy, and which in your opinion is the most accurate.

12. Explain how you would estimate the refractive error of a student's eyes, 35 years of age, employing the dynamic method at 1 metre and also at 16 inches, and write a prescription for constant use.

June, 1926.

GEORGE S. HOUGHTON.

### PRACTICAL OPTICS

1. Write the prescription in two ways for a broken lens which requires a minus 3.00 sphere to neutralize the vertical meridian and a plus 1.25 sphere to neutralize the horizontal meridian.

2. a) What do you understand by the axis of a lens?

b) By the term, Optical centre?

3. a) What are the curves of the wafers in a cement bifocal, if the distance Rx is

$$R. + 2.50 \text{ } \odot + 1.50 \text{ } \times 1.65$$

$$L. + 2.75 \text{ } \odot + 1.75 \text{ } \times 15$$

and the addition is 2.75, and the lenses are toric?

b) If the lenses were flat? Which side do the wafers go on, and why?

4. The Rx calls for a plus 5.00  $\odot + 1.00 \times 90$  combined with a  $\frac{3}{4}$  degree prism, base in. How many mm. would you decenter the lens, and in which direction?

5. Transpose the following lenses:

a)  $+4.50 \times 90 \odot + 1.75 \times 180$

b)  $+.87 \odot - .62 \times 70$

c)  $+2.25 \odot - 3.25 \times 25$

d)  $-.62$  ax 80  $\odot + .87$  ax 170

6. a) How would you adjust a frame if the right lens was higher than the left?

b) Where should the wafers in a bifocal be, in comparison with the pupil of the eye?

7. A lens measure gives the following curves on toric lenses:

- a) Inside 4.00              Outside 6.00 and 7.25
- b) Inside 6.50              Outside 6.00 and 7.75
- c) Inside 6.00              Outside 6.00 and 6.87

Write two prescriptions for each lens.

8. Describe the following lenses:

Toric, meniscus, kryptok, ultex, crookes, lenticular and katral.

9. a) If the bridge of a spectacle frame did not rest flatly on the nose, but the lower edge cut in, how would you remedy it?

b) If the nose is flat, what is the usual length of the shank of the bridge, L, LS, or ELS?

c) When would you give oval lenses?

10. Name the instruments in a fully equipped optical work shop and describe how you would use those necessary in mounting a kryptok in a 1901 mounting.

June, 1926.

MATTHEW J. FOWLER.

### THEORETIC OPTICS

1. State a formula for the Dioptral Expression for Effectivity and do a problem involving it and prove it to be correct.

2. What would be the power and location of the base-apex line of a single prism equivalent to two superimposed prisms as follows:

$4^\Delta$  base up  $\subset$   $7^\Delta$  base out?

3. Determine the magnification of the image of a virtual object lying midway between the vertex and focal point of a convex mirror and draw a diagram showing construction.

4. If double convex lenses are used in the trial frame and meniscus lenses are used in filling the R it is necessary to give the proper correction that the lenses be placed a certain distance from the eye. In determining this distance it is necessary to ascertain the vertex depth of the concave surface, that is the perpendicular distance (t) of the vertex from the plane edge or contour of the surface. If the diameter of this contour expressed in mm is denoted by 2h and if the refracting power of the surface next to the eye expressed in dioptries, is denoted by F<sub>2</sub> and finally, if the index of refraction of the glass is denoted by N show that the vertex depth of the surface is approximately:—

$$t = -0.0005 \frac{h^2 F_2}{n - L} \text{ mm}$$

5. What is the refracting power of a refracting surface of 200 mm radius separating air (n = 1), from glass (n' = 1.5)?

6. A thin crown glass prism of  $15^\circ$ ; index (u 1) = 1.54 is neutralized by a flint glass prism of index (u 2) = 1.62. Find the value of the flint prism in degrees.

June, 1926.

W. I. BROWN.

### PHYSIOLOGICAL OPTICS

1. Explain fully what transpires, in order that a luminous point may be seen distinctly?

2. What conditions must exist in order for two optical systems to be equivalent so far as the position and size of the image are concerned?

3. Explain how the fibers of the optic nerve become stimulated by means of objective light or aether vibrations?

4. What results when one and the same place on the retina is stimulated by light of two or more different vibration frequencies?

5. Define what is known as Czermak's line of accommodation and describe an experiment proving it?

6. Describe what takes place within the eye, when one views an object of spectral red and then one of spectral blue and sees each equally distinct?

June, 1926.

W. I. BROWN.



## THEORETIC OPTOMETRY

Answer 10 questions only.

1. When the ophthalmometer shows the mire images separated at axis 45 and overlapping at 135, what will be the axis of the correcting concave cylinder?

2. Explain Holmgren's test.

3. A Myope of 1.50 D. is using the retinoscope at 26 inches, static method and finds a plus 3.00 D. neutralizes the shadow, what is the correcting lens?

4. What is your method for taking the field of vision? What is a normal field?

5. Which is the more correct term for the instrument; Keratometer or Ophthalmometer and why?

6. If the Optometrist is hyperopic 1.50 D. and without his correction requires a minus 4.50 D. to view the fundus clearly with the ophthalmoscope, direct method, what is the kind and amount of error?

7. About how much difference would you make in fitting a case of anisometropia?

8. A Myope of 6D. has 3D. of accommodation; he wants to read music at 18 inches. State power of lens required so he may use one-half of his accommodation.

9. A Hyperope of 3D. is just able to read at 13½ inches without lenses. How much accommodation has he and what will his P P be with glasses?

10. Give the rule by which the meter angle may be expressed in prism dioptries for any given P.D.

11. Name the causes of convergent strabismus.

June, 1926.

S. W. BAKER.

The examinations as in previous years have occupied four days, the first three being devoted to written examinations on theoretic, technical and practical subjects, while the fourth is devoted to practical demonstration of the use of instruments and methods used in the practice of optometry. In the quality and scope of the written examination, the Board has, during the year, maintained very high standards. The practical demonstration required of the applicant has been more comprehensive than in former years. The Board maintains that before issuing a certificate of registration an applicant must demonstrate a practical understanding of the methods, and proficiency in technique with the instruments used. The applicant is therefore required to make a complete routine examination of a subject's eyes, write a prescription, demonstrate his ability to properly adjust eyeglasses and spectacle frames, and to analyze and neutralize ophthalmic lenses.

All applicants are required to attain the grade of 70 percent as a passing mark in each subject. Those failing in two subjects only, are required to take those subjects again at a subsequent examination. Those failing in more than two subjects are required to take the entire examination over again.

The Board, with the efficient aid of the Department of Public Safety had investigated numerous reports of violations of the optometry law. No prosecutions have been necessary, but several cases of questionable practice have been effectually stopped.

The Board respectfully asks that more commodious accommodations be provided for our records and files, the space now used being inadequate and congested.

In September, His Excellency, Governor Alvan T. Fuller reappointed George S. Houghton of West Somerville, for a term of five years.

At the annual meeting of the Board, Mr. Howard C. Doane of Boston, was re-elected Chairman for the ensuing year, and Mr. George S. Houghton of Somerville was re-elected Secretary for the ensuing year.

During the past year 58 men have qualified for registration by examination; 1 registered by reciprocity. Six certificates were revoked and

four optometrists died. There is now a total of 1,016 registered optometrists in Massachusetts.

## FINANCIAL REPORT

### *Receipts*

Received from applicants for examination .....	\$600.00
Received from re-examination fees .....	65.00
Received from renewals .....	1,870.00
Received for Student Certificate .....	1.00
Received from Reciprocity fee .....	50.00
Received from Fines .....	10.00
	<hr/>
Total Receipts .....	\$2,596.00

### *Expenditures*

Cash paid for compensation for commissioners.....	\$1,900.00
Cash paid for carfare and general office expense....	745.51
	<hr/>
Total Expenses .....	\$2,645.51

Respectfully submitted,

GEO. S. HOUGHTON, *Secretary.*  
 HOWARD C. DOANE, *Chairman.*  
 SAMUEL W. BAKER.  
 WALTER I. BROWN.  
 MATTHEW J. FOWLER.





*The Commonwealth of Massachusetts*

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1927

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DIVISION OF REGISTRATION

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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# The Commonwealth of Massachusetts

## REPORT

### DEPARTMENT OF CIVIL SERVICE AND REGISTRATION

#### BOARD OF REGISTRATION IN OPTOMETRY

STATE HOUSE, BOSTON, MASS., January 4, 1928.

To WILLIAM F. CRAIG, *Director of Registration.*

SIR:—The Board of Registration in Optometry has the honor to submit to you its sixteenth annual report, as required by Section 67, Chapter 112 General Laws.

The Board has held during the year, two examinations; in June and November. The total number of candidates examined was 45. Of this number 14 passed and 31 failed.

The following written examination was given June 28, 29, 30 and July 1, 1927:

#### ANATOMY

1. Name the motor and sensory nerves of the eye. Give their origin and insertion.
2. Describe in detail the choroid, ciliary body and the Iris.
3. Give in detail the vascular circulation of the uveal tract.
4. Define Neuron. Describe the neurons of the retina with nerve connections and endings.

#### PHYSIOLOGY

1. Discuss in detail the functions of the Extrinsic muscles, also the Intrinsic muscles.
2. What is the first essential in vision.
3. Give the functions of the (a) sclera. (b) conjunctiva. (c) cilia. (d) supercilia. (e) Iris. (f) aqueous. (g) vitreous.
4. Discuss fully the function of the ciliary body and processes.

#### PATHOLOGY

1. Define (a) mydriasis, (b) myosis. (c) When are these conditions physiological, (d) when pathological, (e) when mechanical?
2. Does examination with Ophthalmoscope which records no pathology of fundi or media eliminate possibility of diseased conditions?
3. Discuss differentiation in cornea ulcer, conjunctivitis, chalazion, pannus, interstitial keratitis.
4. Describe ophthalmoscopic appearance of Albuminuric Retinitis. Name possible ocular conditions that may arise in the course of nephritis.

June, 1927.

H. C. DOANE.

#### THEORETIC OPTICS

1. Give a general explanation of the interference bands produced in white light by the use of Fresnel's mirrors.
2. Draw two diagrams showing the course of light thru (a) a thick biconvex lens; (b) a thick biconcave lens.
3. What would be the power of a 5  $\nabla$  prism at 40°, its base apex line being at 75°?
4. What are Newton's Rings? For what purpose are they used?
5. A lens measure set to be used on glass of an index 1.52 is used on a lens made of glass with an index 1.56. What will be the error when the reading is +5.7?
6. State a formula for obtaining size of test type if the visual angle is other than 5' (minutes) of arc.

#### PHYSIOLOGICAL OPTICS

1. How do we find out the distance of a perceived object from the eye?
2. a) What is meant by the term *line horopter*?  
b) When is the line horopter said to be vertical and when horizontal?

3. What takes place in the eye when we measure the Amplitude of Accommodation? Explain fully.

4. What are the three classes of functions of the retina? Write briefly on each.

5. Why does the stenopaic slit make objects appear more distinctly and what takes place when its minimum limit is exceeded?

6. Name and locate the optic constants of the eye.

June, 1927.

W. I. BROWN.

### THEORETIC OPTOMETRY

Answer ten questions only.

1. a) What is the astigmatic dial?  
b) How are the charts made use of in testing astigmatism?  
c) How is the meridian of astigmatism determined?  
d) How is the axis of the cylinder placed according to the blackest line selected?  
e) Are minus cylinders used in correcting astigmatism?
2. Explain the V test for astigmatism?
3. a) What is the Ophthalmometer?  
b) If the wires separate in any meridian what does it indicate?  
c) If they lap over what may we assume?  
d) What is the normal curvature of the cornea?  
e) If curvature is more than average what does it indicate? If less what?
4. Using the ophthalmoscope, indirect methods, what are the comparative size of the disc in Emmetropia, Myopia and Hyperopia?
5. Discuss the cross-cylinder check test (a) Its purpose; (b) how and when used; (c) Kind of lenses and charts required. (d) Patient wearing  $+2.75 = -1.00$  cyl ax  $165 = 20/30$ , with a  $-.25 = +.25$  cross cylinder with minus axis over  $-1.00$  cyl patient's vision improves to  $20/20$ . Write the Rx for  $20/20$  vision.
6. State Skiametry with  $+1.50$  before the eye. Point of reversal in 45th meridian is at  $27^\circ$ , and is within the 135th meridian by changing the  $+1.50$  to a  $+2.75$  the point of reversal in the 135th meridian is at  $40^\circ$ . Write the Rx.
7. With the stenopaic slit it requires a  $+1.75$  in the vertical meridian and a  $-.75$  in the horizontal. Write the Rx.
8. Explain the sissors movement in skiametry. Its cause and correction.
9. A presbyope wishes to read at  $13''$  his p.p. is  $16''$ . What lens would be required so he could use  $2/3$  of his accommodation?
10. If the p.r. is  $33$  cm behind the retina and the p.p.  $33$  cm in front, what is the refractive error and amplitude of accommodation?
11. A person 50 years old looking at an object  $20''$  away with a  $-4.00 = +4.00$  cyl ax  $90$  accommodates 1.D. What would be his distant and near correction?
12. Discuss the utility of Kratometer?

June, 1927.

S. W. BAKER.

### PRACTICAL OPTOMETRY

Answer ten of the following questions. Confine your answers in the following cases to writing a prescription of your analysis of each, discussing your reasons for your procedure.

1. Housewife, age 47. History, frontal and occip. headaches, general nervous disturbances, tension normal, reflex poor, requires for distance O. D.  $+25$  cyl ax  $30$  O. S.  $+50$  cyl ax  $135$  add for near  $+150$  O. U. has  $1\frac{1}{4}$  right Hyper. at  $20$  ft. and  $14^\circ$  Exo. at  $14$  in.

2. Music Teacher, age 29. History, eyes tire and blur. Frontal headaches, dizziness, ocular tension normal, manifest  $2^\circ$  Eso. and  $8^\circ$  Exo.  $1\frac{1}{2}$  right Hyper. at  $20$  ft. and  $5^\circ$  right Hyper. at  $14$  in. Trial case O. D.  $+250 = -450$  cyl ax  $160$ . O. S.  $+225 = -325$  cyl ax  $05$ . Dynamic Skia  $16$  in. O. D.  $+400 = -350$  cyl ax  $160$ . O. S.  $+400 = -350$  cyl ax  $8$ .

3. Lawyer, age 50. History, two attacks Iritis in last three years. Eyes tire, blur for distance and near. X-rays of teeth, abscess on one which was removed. Media dull on Dynamic Skia at  $14$  in. O. D.  $+325 = -75$  cyl ax  $180$ , O. S.  $+275 = -100$  cyl ax  $155$ . Trial case O. D.  $+50$  cyl ax  $90$ , O. S.  $-125$

cyl ax 155, add + 250 O. U. for near. Manifests  $2^{\circ}$  L. Hyper. at 20 ft.,  $8^{\circ}$  Exo. at 14 in.  $4^{\circ}$  L. Hyper. at 14 in.

4. Shop Superintendent, age 64. History, dizziness, eyes tire and blur, unable to drive car. Media dull. Tension strong. Eyes protrude, pupil size 5 m/m, contour O. K. Dynamic Skia at 14 in. O. D. + 350 = - 200 cyl ax 150. O. S. + 50 = - 100 cyl ax 75, add + 250 O. U. for near. Manifests  $13^{\circ}$  Eso. and  $7^{\circ}$  L. Hyper. at 20 ft.,  $2^{\circ}$  Eso. and  $7^{\circ}$  L. Hyper. at 14 in.

5. Housewife, age 60. History, pain back of eyes and top of head, dizziness. Dynamic Skia at 14 in. O. D. + 550 = - 225 cyl ax 165, O. S. + 575 = - 425 cyl ax 170. Subjective O. D. + 250 = - 225 cyl ax 165, O. S. + 250 = - 425 cyl ax 170, add + 250 for near. Manifests  $15^{\circ}$  Eso. at 20 ft.,  $32^{\circ}$  Exo. at 14 in.

6. Retired Business Man, age 70. History, dizziness, sees two objects near work causing slight nervous disturbance. Ophthalmoscope shows fundus in good condition, circulation good with blood stream thin. Dynamic Skia at 14 in. O. D. + 300 = - 50 cyl ax 105, O. S. + 300 = - 50 cyl ax 90. Manifests  $25^{\circ}$  Eso. at 20 ft.,  $9^{\circ}$  Eso. at 14 in. Subjective O. D. + 225 = - 50 cyl ax 105, O. S. + 225 = - 50 cyl ax 90, add + 250 O. U. for near.

7. Discuss fully your reasons for using the Ophthalmoscope describing both the direct and indirect methods and value of each in Optometrical practise.

8. Discuss fully your procedure in examining the eyes of a man, age 55, requiring distant and near lens employing static and dynamic methods with plain retinoscope and trial lens. Write a prescription of your findings.

9. Teacher, age 26. History, eyes tire, objects blur at times. Dynamic Skia at 14 in. O. D. + 225 = - 50 cyl ax 90, O. S. + 250 = - 50 cyl ax 90. Subjective O. D. + 100 = - 50 cyl ax 90, O. S. + 125 = - 50 cyl ax 90. Manifests  $21^{\circ}$  Eso. and  $2^{\circ}$  L. Hyper. at 20 ft. At 14 in.  $21^{\circ}$  Eso. and  $\frac{1}{2}^{\circ}$  L. Hyper.

10. Bookkeeper, age 40. Dynamic Skia at 16 in. O. D. - 100 = - 50 cyl ax 90, O. S. - 75 = - 25 cyl ax 90. Subjective O. D. - 200 = - 50 cyl ax 90, O. S. - 175 = - 25 cyl ax 90. Manifests  $6^{\circ}$  Eso. + 1 R. Hyper. at 20 ft.,  $21^{\circ}$  Exo. at 16 in.

11. Bookkeeper, age 31. Dynamic Skia at 16 in. O. D. + 100 = - 50 cyl ax 180, O. S. + 100 = - 50 cyl ax 180. Subjective O. D. - 50 cyl ax 180, O. S. - 50 cyl ax 180. Manifests  $13^{\circ}$  L. Hyper. and  $6^{\circ}$  Exo. at 20 ft.,  $10^{\circ}$  L. Hyper. and  $9^{\circ}$  Exo. at 16 in.

12. Housewife, age 47. History, nervous, eyes blur for distance and near, pain around eyes. Dynamic 16 in. O. D. + 350 = - 25 cyl ax 135, O. S. + 350 = - 50 cyl ax 180. Subjective O. D. + 150 = - 25 cyl ax 135, O. S. + 150 = - 50 cyl ax 180.  $2^{\circ}$  Eso. at 20 ft.,  $14^{\circ}$  Exo. and  $1^{\circ}$  L. Hyper. at 16 in.

June, 1927.

G. S. HOUGHTON.

### PRACTICAL OPTICS

1. Using spherical lenses only, state which lenses you would use to neutralize the following:

- 125 cyl  $\times$  180 = + 100 cyl  $\times$  90.
- + 37 cyl  $\times$  75 = + 75 cyl  $\times$  165.
- + 75 Sph = - 175 cyl  $\times$  180.
- 125 Sph = + 62 cyl  $\times$  90.

2. a) What is the dioptric value of the following lenses combined: + 150 cyl  $\times$  75 = - 75 cyl  $\times$  165 = + 50 Sph = - 75 cyl  $\times$  75 = - 125 Sph.

b) In surface grinding a lens, how many grades of abrasives are used and what is the object of each grade?

3. a) In looking through a lens, how would you decide whether it is a cylinder, sphere or sphero-cylinder?

b) If a compound lens, plus on plus, were placed before you, with axis of cylinder set with an inclination somewhere between  $90^{\circ}$  and  $180^{\circ}$ , state how you would determine, by looking through the lens that the axis was not between zero and  $90^{\circ}$ ?

4. a) What is the difference between a 1/10 10K White Gold frame and a 10K White Gold frame?

b) What is the difference between a shell riding bow frame and a zylonite skull-fit frame?



5. a) The right ear is higher than the left. How would you adjust a skull-fit frame?

b) The right side of the nose is more prominent than the left. How would you adjust an eye glass?

6. a) Patient requires N  $2\frac{1}{2}$  bridge for spectacles. P.D. 62 mm. What size finger piece mounting and lenses would you prescribe?

b) Patient requires No. 242 finger-piece mounting, lenses  $41 \times 36$ . What size spectacle bridge would you prescribe, and what would be the P.D.

7. a) Bridge measurements  $\frac{1}{8} \times \frac{5}{8} \times \frac{1}{16}$  in. Explain how you would bend so as to make bridge  $0 \times \frac{1}{2} \times \frac{1}{10}$  out.

b) If the nose is flat, what is the usual length of shank of the bridge?

8. Since the thickness of a plus lens makes its power slightly different from that of a minus lens ground on the same curvatures, how is it that corresponding lenses in plus and minus as found in the trial case neutralize?

9. a) Prescription reads as follows:

O. D. + 3.50 sph. = + 150 cyl  $\times$  90 Decenter in 4. mm.

O. S. + 4.00 sph. = + 50 cyl  $\times$  180 Decenter in 4. mm.

What is the amount of each prism?

b) How many millimeters will be required to decenter each of the following lenses:

+ 2.00 sphere —  $1^\circ$  prism, base in.

+ 2.75 sphere = — 50 cyl  $\times$  90 —  $1\frac{1}{2}^\circ$  prism, base out.

10. A patient's Rx is O. U. The curve of one side of the wafers is—3.75. The outside curve of the lenses is + 6.00 combined with + .50 cylinder. What is the addition for reading and the inside curve of the lenses, they being Toric?

June, 1927.

M. J. FOWLER.

The examinations as in previous years have occupied four days, the first three being devoted to written examinations on theoretic, technical and practical subjects, while the fourth is devoted to practical demonstration of the use of instruments and methods used in the practice of optometry. In the quality and scope of the written examination, the Board has, during the year, maintained very high standards. The practical demonstration required of the applicant has been more comprehensive than in former years. The Board maintains that before issuing a certificate of registration an applicant must demonstrate a practical understanding of the methods, and proficiency in technique with the instruments used. The applicant is therefore required to make a complete routine examination of a subject's eyes, write a prescription, demonstrate his ability to properly adjust eyeglasses and spectacle frames, and to analyze and neutralize ophthalmic lenses.

All applicants are required to attain the grade of 70 percent as a passing mark in each subject. Those failing in two subjects only, are required to take those subjects again at a subsequent examination. Those failing in more than two subjects are required to take the entire examination over again.

The Board, with the efficient aid of the Department of Public Safety had investigated numerous reports of the violations of the optometry law. No prosecutions have been necessary, but several cases of questionable practice have been effectually stopped.

The Board respectfully asks that more commodious accommodations be provided for our records and files, the space now used being inadequate and congested.

In September, His Excellency, Governor Alvan T. Fuller reappointed Howard C. Doane of Boston for a term of five years.

At the annual meeting of the Board, Mr. Howard C. Doane of Boston, was re-elected Chairman for the ensuing year, and Mr. George S. Houghton of Somerville was re-elected Secretary for the ensuing year.

During the past year 14 persons have qualified for registration by examination. Six certificates were revoked and 15 optometrists died. There is now a total of 1009 registered optometrists in Massachusetts.

## FINANCIAL REPORT

*Receipts*

Received from applicants for examination . . . . .	\$400.00
Received from re-examination fees . . . . .	75.00
Received from renewals . . . . .	1,864.00
Received from H. S. exams . . . . .	25.00
Received for duplicate certificate . . . . .	5.00
Total Receipts . . . . .	<u>\$2,369.00</u>

*Expenditures*

Cash paid for compensation for commissioners . . . . .	\$1,900.00
Cash paid for travel expense . . . . .	246.03
Cash paid for general office expense . . . . .	227.50
Total Expenses . . . . .	<u>\$2,373.53</u>

Respectfully submitted,

HOWARD C. DOANE, *Chairman.*  
 GEO. S. HOUGHTON, *Secretary.*  
 WALTER IRVING BROWN,  
 MATTHEW J. FOWLER,  
 SAMUEL W. BAKER.





The Commonwealth of Massachusetts

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1928

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DIVISION OF REGISTRATION

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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# The Commonwealth of Massachusetts

## REPORT

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION.

BOARD OF REGISTRATION IN OPTOMETRY

STATE HOUSE, BOSTON, MASS., FEBRUARY 11, 1929.

TO WILLIAM F. CRAIG, *Director of Registration.*

SIR:—The Board of Registration in Optometry has the honor to submit to you its seventeenth annual report, as required by Section 67, Chapter 112 General Laws.

The Board has held during the year, two examinations; in June and November. The total number of candidates examined was 53. Of this number 13 passed and 40 failed.

The following written examination was given June 19, 20, 21, and 22, 1928:

### ANATOMY

1. Which two of the three primary structures of the Ovum namely the Mesoderm, the entoderm and the ectoderm participate in the development of the eye in embryo? Name the structures of the eye formed from each.

2. Name two varieties of muscles so that the functional as well as the structural properties are indicated. Describe the cellular structure of each variety.

3. Locate in the brain (a) the lower visual center. (b) the higher visual centers.

4. Describe the rods and cones of the retina.

### PHYSIOLOGY

1. How do different portions of the retina vary in their power to distinguish (a) color. (b) form?

2. Discuss the physiological functions of the canal of Schlemm, Hyaloid Canal, Hyaloid membrane.

3. Explain the functions of (a) convergence. (b) accommodation. Give the nervous mechanism of each.

4. What are the blind spots, macula lutea and fovea centralis.

### PATHOLOGY

1. Differentiate an anterior polar cataract and central opacity of the cornea.

2. Describe the ophthalmoscopic appearance of fundus in the following conditions: Retinitis circinata, embolism of the central retinal artery; choked disc, and optic neuritis.

3. Describe appearance of acute iritis; give causes and symptoms.

4. Differentiate acute conjunctivitis and uveitis. Discuss symptoms.  
June, 1928. HOWARD C. DOANE.

### THEORETIC OPTICS

1. (a) What wave lengths limit the visible part of the spectrum? State in  $\mu$  and color.

(b) How are the rays designated beyond the long and short wave limits of the visible spectrum?

(c) Ordinary crown spectacle lenses absorb rays beyond what wave lengths?

2. What is the law of reflection and what would be the normal of a c c mirror?

3. Explain the refraction of divergent rays from a point of light thru a planoconvex cylinder. Illustrate by diagram.

4. What change takes place in the focal length of a thin biconvex lens when placed in turpentine?

5. Describe polarisation by (a) refraction; (b) by reflection.

6. Assuming that the cornea of the eye is a spherical refracting surface of 8 mm. radius and the aqueous humor index of refraction is 1.33. What will be the real distance of the pupil of the eye from the vertex of the cornea if the apparent distance is 3.04 mm.

#### PHYSIOLOGICAL OPTICS

1. What would be the effect on the retinal image if a biconvex lens is moved from a position in which the optical center of the lens coincides with that of the anterior focal point of the eye to a position nearer the eye?

2. What is the amplitude of accom. of a myope of 2 D whose near point is 8 cm. in front of his eye?

3. Explain why there is a varying acuity of form sense in different parts of the retina.

4. During the act of accommodation describe what changes take place in the posterior surface of the lens, according to Helmholtz theory of accommodation.

5. How does the focal length of the crystalline lens compare with that of a lens of the same external form; made of a homogeneous substance, of the same density and index of refraction as that of the nucleus of the crystalline lens?

6. Under what condition of illumination does the psychophysical Law of Fechner hold true? Explain reason for answer.

WALTER I. BROWN.

#### THEORETIC OPTOMETRY

Answer ten questions only.

1. Differentiate between divergence excess and convergence insufficiency.

2. What is meant by sectional accommodation, how determined and corrected?

3. Why does a presbyope prefer to read while facing a bright light?

4. How would you take the amplitude of accommodation and range of vision in presbyopia by means of the cross cylinder test?

5. If an eye sees the vertical lines distinctly at first and in a few seconds the horizontal lines, what is the reason for this change and how overcome.

6. A person has supraduction of the right eye of  $4^\circ$  and  $2^\circ$  of the left eye. What phoria would you suspect and how much?

7. How would you treat a case of strabismus.

8. What is meant by repression in refraction work?

9. Differentiate between correcting and corrective prisms.

10. If an ophthalmometer reading 44 D in the horizontal meridian and 42 D in the vertical, what information does this give relative to the refraction of the eye?

11. If an eye is overdeveloped  $2/3$  mm. and has 8D of accommodation, what is the range of vision?

12. Describe the stereoscopic treatment in developing the fusion faculty.

June, 1928.

S. W. BAKER.

#### PRACTICAL OPTOMETRY

1. Give in complete detail your method of procedure in making an examination of the eyes, and give your reasons for the order in which you use the various instruments and methods.

2. Discuss fully the direct and indirect methods of using the Ophthalmoscope explaining in detail the value of each in Optometric practice.

3. Patient 25 years of age, Bookkeeper, comes for examination: history, work blurs at times; requires for a correction + 2.00 D Sphere

o. u. Right eye adduction  $24^\circ$ , abduction  $3^\circ$ , subduction  $\frac{1}{2}^\circ$ , superduction  $3^\circ$ . Discuss your reasons for his trouble and give correction for constant use.

4. Secretary age 20, wearing O. D. — 4.75 =  $1^\circ$  out, O. S. — 4.50 =  $1^\circ$  out. History, constant headache, blurring of vision. Examination shows fundus normal. Dynamic skia at 16 in. O. D. — 3.75 O. S. — 3.25 subjective cross cyl at 20 ft. O. D. — 4.25 O. S. — 4.00 adduction 12 abduction  $2^\circ$  manifests  $8^\circ$  Eso, at 14 in. employing a  $6^\circ$  prism up over left eye with the dot and line chart. Discuss fully how you would handle the case and correction for constant use.

5. Housewife, age 37 years wearing — 200 o. u. History, frontal and occipital headaches, examination normal fundus. Dynamic at 14 in. O. D. — 2.00 O. S. — 1.00. Subjective cross cyl at 20 ft. O. D. — 2.75 O. S. — 1.75 adduction  $14^\circ$  abduction  $3^\circ$  manifests  $8^\circ$  Eso. at 14 in. employing a  $6^\circ$  prism up over left eye with dot and line chart. Discuss fully how you would handle this case with correction for constant use.

6. Discuss fully Static Skia. employing plain mirror at 16, 20 and 40 in. and write a prescription for each.

7. Discuss Dynamic Skia, employing plain mirror at 14 and 40 in. on patients 16 and 48 years of age, and give correction for constant use.

8. Student age 14 years wearing O. D. — 2.50 O. S. — 2.00 Examination subjective O. D. — 2.75 = — 50 cyl.  $\times$  180 O. S. — 1.50 = — 50 cyl  $\times$  180 maddox rod test at 20 ft.  $4^\circ$  Eso and  $10^\circ$  Right Hyper at 14 in. employing  $6^\circ$  up over left eye  $4^\circ$  Eso  $20^\circ$  base in and  $6\frac{1}{2}^\circ$  R. Hyper. cross cyl. at 14 in. O. D. — 1.75 O. S. — 1.00. Write a prescription for constant use and give in complete detail your reasons for same.

9. Student, age 18, anemic, nervous, eyes blur at near work. Dynamic Skia. at 16 in O. D. + 4.00 O. S. + 6.00 Subjective at 20 ft. employing chart and cross cyl O. D. + 2.00, O. S. + 4.00 adduction 10, abduction  $3^\circ$  manifests  $6^\circ$  Eso at 16 in using a  $6^\circ$  prism base up with dot and line chart. Discuss how you would handle this case and correction for constant use.

10. Patient 60 years of age, paper hanger, comes for examination; History, dizziness; working at 20 inches with plane mirror by the usual static method, it required a + 4.00 D Sphere to cause reversal at 16 inches: by the Dynamic method a + 6.75 D. Sphere. Right eye adduction  $8^\circ$  abduction  $2^\circ$  superduction O. subduction  $3^\circ$  muscles of left eye normal. What would be your correction for constant use? Explain fully.

June, 1928

G. S. HOUGHTON.

### PRACTICAL OPTICS

1. (a) In surface grinding, using three grades of emery and then rouge, is there any difference in speed of machine in different operations?

(b) When edge-grinding, what effect would speeding up the stone have?

2. When can a lens be toric (a) and yet have both sides convex? (b) Give an example.

3. Would you decenter or surface-grind the following on a + 4.50 cyl ax  $90^\circ$ ?

(a)  $1^\circ$  prism, base down.

(b)  $1^\circ$  prism, base out.

4. The lenses of a pair of spectacles are in perfect position before the patients eyes, but the lower edge of bridge cuts the nose;

(a) State where and what directions the bends should be made to overcome this trouble, and still keep the lenses properly adjusted.

(b) Patient wearing eye-glasses, complains that eye lashes touch the left lens: Describe in detail the adjustment.

5. Transpose the following:

(a) + 225 cyl  $\times$  10 = + 75 cyl  $\times$  100

(b) 125 cyl  $\times$  60 = + 175 cyl  $\times$  150

(c) + 275 sph = - 50 cyl  $\times$   $90^\circ$ ,  $2^\circ$  prism, base in.



6. What is the difference between cloth an pitch polishing?
  - (b) What effect would you have from constantly grinding + 6.00 curve lenses on the outer edge of surfacing tool?
7. With a P. D. of 60 mm. and 20 mm. taken up by the bridge, how can a lense 43 mm. long be given, and still be correctly adjusted?
8. (a) How is optical glass made?
  - (b) How are optical blanks made?
9. (a) What style of zylonite frame would you advise, to fit a very low flat nose?
  - (b) When would you advise a high bridge frame?
10. Which increase faster in dioptric power, the distance or reading, when a plus curve is ground:
  - (a) On the disc side of a fused bifocal?
  - (b) On the opposite side?

June, 1928

M. J. FOWLER.

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During the past year 13 persons have qualified for registration by examination. Seven certificates were revoked and seven optometrists died. There is now a total of 1,008 registered optometrists in Massachusetts.

#### RECOMMENDATION

The members of the Board feel that optometrists should be accorded the same protection as other professions dealing with the public health in the application of the law relative to the limitation of actions for malpractice, error or mistake. The law as it now stands does not apply to Optometrists. We therefore recommend an amendment to Sect. 4 of Chap. 260, G. L., as amended by Sect. 1 of Chap. 319 of the Acts of 1921, as outlined in the accompanying draft and duly submitted to the Secretary of State.

Section 1. Section four of chapter two hundred and sixty of the General Laws, as amended by section one of chapter three hundred and nineteen of the acts of nineteen hundred and twenty-one, is hereby further amended by inserting after the word "dentists" in the seventh line, the word:—optometrists,—so as to read as follows:—Section 4. Actions for assault and battery, false imprisonment, slander, actions against sheriffs, deputy sheriffs, constables or assignees in insolvency, for the taking or conversion of personal property, actions of tort for injuries to the person against counties, cities and towns and actions of contract or tort for malpractice, error or mistake against physicians, surgeons, dentists, optometrists, hospitals and sanitarium, shall be commenced only within two years next after cause of action accrues; and actions for libel shall be commenced only within one year next after the cause of action accrues.

Section 2. This act shall take effect upon its passage.

#### FINANCIAL REPORT

##### *Receipts*

Received from applicants for examination .....	\$550.00
Received from re-examination fees .....	100.00
Received from renewal fees .....	1,866.00
Received for duplicate certificates .....	10.00
Fine .....	5.00
Total Receipts .....	<u>\$2,531.00</u>

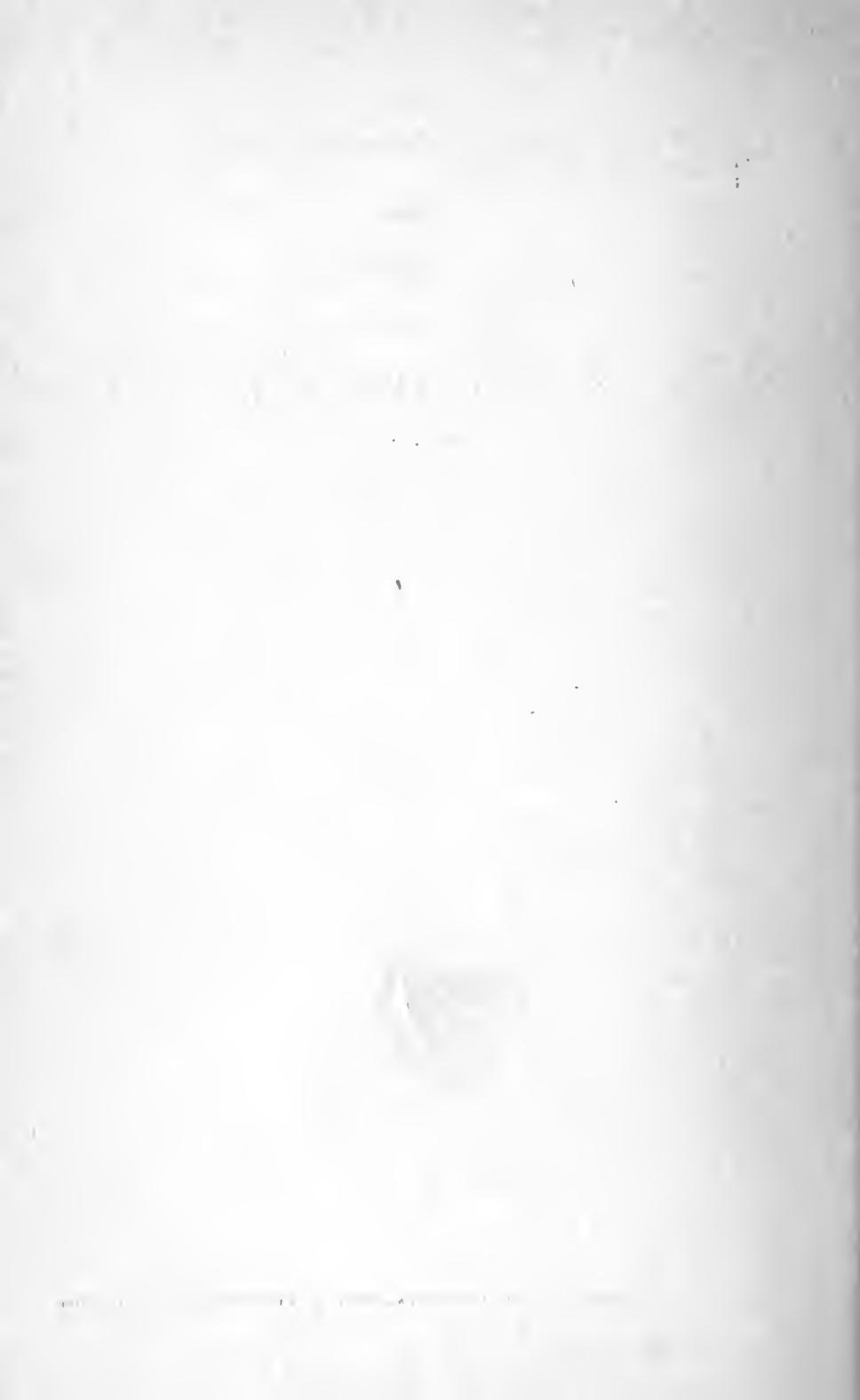
##### *Expenditures*

Cash paid for compensation for commissioners .....	\$1,900.00
Cash paid for travel expenses .....	248.78
Cash paid for general office expense .....	453.90
Total Expenses .....	<u>\$2,602.68</u>

Respectfully submitted,

HOWARD C. DOANE, *Chairman*  
 GEO. S. HOUGHTON, *Secretary*.  
 SAMUEL W. BAKER,  
 MATTHEW J. FOWLER,  
 WALTER IRVING BROWN.





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*The Commonwealth of Massachusetts*

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1929

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DIVISION OF REGISTRATION

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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University of Massachusetts

REPORT

BOARD OF REGISTRATION IN OPTOMETRY  
STATE HOUSE, BOSTON, MASS., DECEMBER 4, 1929.

TO WILLIAM F. CRAIG, *Director of Registration*.

SIR:—The Board of Registration in Optometry has the honor to submit to you its eighteenth annual report, as required by Section 67, Chapter 112 General Laws.

The Board has held its usual biannual examinations; in June and November. The total number of candidates examined were 59. Of this number 12 passed and 47 failed.

The following written examination was given June 25, 26, 27 and 28, 1929.

ANATOMY

1. What is a living cell? Describe the production or development of nerve tissue from the cell.
2. Discuss in detail the distribution of the nerve fibres of the optic nerve after it enters the eye.
3. Trace the arterial blood stream from the heart to the choroid and retina also the return of the blood through the venous system.
4. Describe anatomically the uveal tract.

PHYSIOLOGY

1. The act of vision may be divided into three phases, (a) a physical or physico-chemical phase, (b) a physiological phase, and (c) a psychological phase. Discuss these phases minutely, where each takes place and what organs are involved in each phase.
2. Discuss physiologically, central and indirect vision.
3. Give the functions of (a) the cornea, (b) the iris, (c) the aqueous, (d) the vitreous, (e) the ciliary body and processes.
4. What muscles and nerves are involved in the act of (a) adduction, (b) abduction, (c) supraduction, (d) infraduction, (e) torsion?

PATHOLOGY

1. What definite diagnostic points would determine Glaucoma?
2. (a) Homonymous halves of the visual fields are blind. Where would the lesion be located?  
(b) Enlargement of the blind spot determined by perimetry would indicate what pathology?
3. Describe the Ophthalmoscopic picture of a choked disc using the following points of notation: 1, form and size; 2, color and transparency; 3, margins; 4, conditions of level; 5, conditions of vessels.
4. When white spots are seen in the fundus how would you determine whether they were retinal or choroidal?

June, 1929.

H. C. DOANE.

THEORETIC OPTICS

1. When is the refractive relationship discovered by Willebrod Snellins (Snell's Law) applicable?
2. Two thin lenses are in contact, and form an achromatic combination, one being biconvex and the other biconcave. Calculate from the following data the radius of curvature of each surface of the concave lens, and the focal length of the combination.  
Convex lens radius of curvature 10 cms., index of refraction for red 1.480; for violet 1.499. Concave lens: index of refraction for red 1.610, for violet 1.667.

3. What is meant by dispersive power?
4. What is the proportional power of a  $1^\circ$  prism  $60^\circ$  from the base apex line?
5. Describe absorption, with reference to light radiation.
6. Draw a diagram showing the angles, alpha and Gamma.

#### PHYSIOLOGICAL OPTICS

1. Draw a diagram showing the relationship of the pupil to the nodal point and explain why this is of advantage.
  2. Explain the limitations of the Law of Fechner.
  3. Describe physiologic binocular diplopia.
  4. Define Horopter.
  5. Draw two diagrams, one showing the effect on the size of the diffusion circles because of varying distance from the retina to the focus of the rays, and the other showing what effect varying sizes of the pupil have upon the diffusion circles.
  6. Why is it important to know the normal limits of the light and color perceptive areas of the retina?
- June, 1929.

W. I. BROWN.

#### THEORETIC OPTOMETRY

Answer ten questions only.

1. Give six scientific reasons why you should use the ophthalmometer.
  2. Give Javal's rule for prescribing cylindricals from ophthalmometer readings.
  3. How many M.A. of positive convergence, in reserve, must a person have to read comfortable at 33 cm.?
  4. Differentiate between Heterophoria and Heterotrophia (a) causes and conditions; (b) how determined.
  5. Ophthalmoscopy by red free light (a) theory, (b) why superior to white light, (c) describe its use in examining cornea, lens and vitreous.
  6. Explain the theory of "Physiologic Exophoria."
  7. The Version test—discuss two important diagnostic findings.
  8. Perspective—describe three chief causes and their correction.
  9. Ocular Vertigo—its symptoms and probable causes and correction.
  10. How is squint measured by the Perimeter?
  11. What is meant by charting the visual color fields, give sizes, colors, etc.
  12. Describe the use of the Wells-DeZeng Phorometer.
- June, 1929.

S. W. BAKER.

#### PRACTICAL OPTOMETRY

Answer the following questions. Confine your answers to writing a prescription of your analysis of each, discussing your reasons for your procedure.

1. Patient 64 years of age, general health poor. History, sees two objects, unable to do close work. Dynamic findings at 14 inches O.D. + 4.00 O.S. + 4.25. Subjective O.D. + 1.50 O.S. + 1.75, has  $5^\circ$  Eso. and  $9^\circ$  Left Hyper. at 20 ft.,  $8^\circ$  Exo. and  $5^\circ$  Left Hyper. at 14 inches.
2. Patient 46 years of age, general cook. History, eyes tire both for distance and near work. Dynamic findings at 14 inches O.D. + 3.75 = - 25 cyl  $\times$  90 O.S. + 3.50 sphere. Trial case for distance O.D. + 1.25 = - 1.25 cyl  $\times$  90 O.S. + 1.00 sphere. Tonicity at 20 ft.  $3^\circ$  Eso. and  $2\frac{1}{2}^\circ$  Right Hyper. Prism and dot test at 14 in.  $4^\circ$  Right Hyper. and  $5\frac{1}{2}^\circ$  Exo.
3. Patient 10 years of age comes for examination; Static findings at 1 meter o. u. + 2.00 = - 50 cyl ax 180. Dynamic at  $\frac{1}{2}$  metre o. u. + 4.00 = - .75 cyl ax 180. Has  $10^\circ$  esophoria at 20 ft.  $2^\circ$  esophoria at 14 in.
4. Patient clerk 39 years of age; history frontal and occipital headaches. Subjective findings o. u. + 1.50 = - 75 cyl ax 90. Dynamic at 1 metre o. u. + 2.75 = - 75 cyl ax 90. has  $12^\circ$  Esophoria at 20 ft.  $5^\circ$  esophoria at 14 inches.

5. Patient housewife, 47 years of age. History frontal and occipital headache, dizziness, eyes tire and blur. At distance and near: requires for distance O.D.  $+ 2.50 = - 75$  cyl ax 180 O.S.  $+ 2.75 = - 50$  cyl ax 180 combined with  $+ 1.25$  sph. o. u. for near. Near point o. u. 10 inches  $2^\circ$  Exo. vertical muscles normal at 20 ft.  $15^\circ$  Exo. and  $1^\circ$  R. Hyper. at 14 inches.

6. Patient housewife, 56 years of age, requires for distance O.D.  $+ 4.75 = - 3.00$  cyl  $\times 145$  O.S.  $+ 4.50 = - .50$  cyl  $\times 90$  combined with  $+ 2.50$  sph. o. u. for near  $5^\circ$  Eso. and  $2^\circ$  R. Hyper. at 20 ft.  $5^\circ$  Exo. and  $3^\circ$  R. Hyper. at 14 inches.

7. Patient teacher, age 26. History, eyes tire, objects blur at times. Dynamic skia. at 14 inches O.D.  $+ 275 = - 50$  cyl  $\times 90$  O.S.  $+ 3.00 = - 50$  cyl ax 90 subjective O.D.  $+ 100 = - 75$  cyl ax 90 O.S.  $+ 125 = - 50$  cyl ax 90. Manifests  $21^\circ$  Eso. and 2 L. Hyper. at 20 ft. At 14 in.  $11^\circ$  Eso. and 1 L. Hyper.

8. Patient 20 years of age; history, frontal headaches, subjective findings o. u.  $= + .75$  D. sphere  $= - .25$  cyl ax 90. Dynamic findings at 1 metre o. u.  $+ 1.50$  sphere  $= - .25$  cyl ax. 90. Cross cyl test at 20 ft. o. u.  $+ 1.25$  sphere  $= - .50$  cyl ax .90.

9. Bookkeeper, age 31. Dynamic Skia. at 16 in. O.D.  $+ 125 = - 50$  cyl ax 180 O.S.  $+ 100 = - 50$  cyl ax 180. Subjective O.D.  $- 50$  cyl ax 180 O.S.  $- 50$  cyl ax 180. Manifests  $3^\circ$  L. Hyper. and  $6^\circ$  Exo. at 20 ft.  $2^\circ$  L. Hyper. and  $9^\circ$  Exo. at 16 in.

10. Housewife, age 47. History, nervous, eyes blur for distance and near pain around eyes. Dynamic 16 in. O.D.  $+ 350 = - 25$  cyl ax 135 O.S.  $+ 350 = - 50$  cyl ax 180. Subjective, O.D.  $+ 150 = - 25$  cyl ax 135. O.S.  $+ 150 = - 50$  cyl ax 180.  $2^\circ$  Eso. at 20 ft.  $14^\circ$  Exo and  $1^\circ$  L $^\circ$  Hyper. at 16 inches.

June, 1929.

G. S. HOUGHTON.

### PRACTICAL OPTICS

1. Give three reasons for a spectacle frame projecting out from face on the right side.

2. Name the base curves of each of the following lenses: Moniscus. Toric. Rcx. Pec.

3. Give the dioptral value of each curve of the following Toric lens:  
 $- 50 = - 50 \times 180$

4. Give the curves of the wafers required for the following cement bifocals

$$\begin{array}{l} \text{O D } + 50 = - 50 \times 90 \\ \text{O S } - 50 = - 62 \times 90 \end{array} \left. \vphantom{\begin{array}{l} \text{O D } + 50 = - 50 \times 90 \\ \text{O S } - 50 = - 62 \times 90 \end{array}} \right\} \text{add } + 275$$

5. A rough blank is 3 mm. thick. A  $+ 50$  cyl. is ground on one side. What is the power of the sphere ground on other side which leaves the thinnest edge 1 mm. thick, allowing 5 points for surfacing. Lens to be 42 mm. Rd.

$$\begin{array}{ccc} & + 475 & + 525 \\ 6. \text{ The wafers are O D } & \frac{\quad}{- 325} \text{ and } & \frac{\quad}{- 375} \end{array}$$

The astigmatism requires  $+ 125$  cyl  $\times 110$  to correct. Distant lens broken. What is the prescription?

7. White gold frame with high bridge and pads set the (a) Lenses 3 mm. too high and P.D. No. 3 mm. too narrow. How would you adjust? (b) Bifocal lenses set too low in Zyl frame high bridge. How would you adjust?

8. Transpose the following:

- $- 125$  cyl  $\times 80 = - 112$  cyl  $\times 170$
- $+ 75$  cyl  $\times 115 = - 125$  cyl  $\times 25$
- $+ 112$  Sphere  $= - 125$  cyl  $\times 20$
- $- 162$  Sphere  $= - 87$  cyl  $\times 80$



9. A) Why do some people complain of seeing colors in looking through a Kryptok lens. How can this be overcome?

B) What causes colors in a cement bifocal? How can this be overcome?

10. A person wears O.D. + 10.00  
O.S. — 10.00

What happens if both lenses are inadvertently decentered up 5 mm. each. Out 5 mm. each.

June, 1929.

M. J. FOWLER.

The November examination was held on the 19th, 20th, 21st and 22nd with each member giving the same subjects as in the June examinations. With the present methods of office practice reaching a very much higher standard than ever before and with lenses of the corrected type being generally used it became necessary to change our refractive lens equipment to that now in use so that the students would be able to work with the same modern type as used in the schools. This now makes it possible for us to examine the students practically in all phases of modern optometric practice, except that of field mapping and when this instrument is available we will be thoroughly equipped in present day instrument requirements and will be equally equipped with any of the other State Boards of Optometry. The Board believes that the practical demonstration of a student's ability to make an optometric examination is equally important to his theoretical knowledge and each student must make a routine examination and obtain a grade of 70% the same as in his written work. The Board is determined to maintain the standards of its examination, both written and practical, having them at least equal of those given in any other state. It believes this to be a guarantee of the Public Health Service that the Optometrists will render.

The legislature at its last session passed an act extending to optometrists the provision of Law relative to the limitations of action for malpractice, error or mistake as recommended to the General Court by this Board last year. His Excellency the Governor, Frank G. Allen approved it February 8th.

In March Mr. Walter Irving Brown of New Bedford was elected Secretary for the remainder of the year, Mr. Geo. S. Houghton of Somerville having resigned from this position.

The Supreme Court of Massachusetts rendered a decision written by Chief Justice C. J. Rugg, favorable to the Commonwealth in its case against the Kresge Company and the decision is one of great value in that it upholds the constitutionality of our present Optometry Law and should protect the public from the vicious custom of glasses being dispensed without a proper examination. Our case was most ably presented by the Attorney General's Department.

This victory for public health protection was short lived as these stores are now employing medical practitioners to act as salesmen and as medical practitioners are exempt under our Law, the public can now obtain glasses without a proper examination.

His Excellency the Governor, Frank G. Allen, reappointed Mr. Samuel W. Baker of Rockland for five years, at the expiration of his term last September.

The usual efficient co-operation has been rendered this Board by the Department of Public Safety and the reported violations of the Optometry Law have been investigated and two convictions of its violations have been obtained. The number of complaints registered with the Board this year has been below the average received for several years past.

The Board respectfully asks that additional files be provided for our records, as the present files are exceedingly congested.

At the annual meeting of the Board, Mr. Howard C. Doane of Boston

was elected Chairman for the ensuing year, and Mr. Walter Irving Brown of New Bedford was elected Secretary for the ensuing year.

During the past year 14 persons have qualified for registration by examination. Thirteen certificates were revoked and eight optometrists died. There is now a total of 1,001 registered optometrists in Massachusetts.

### FINANCIAL REPORT

#### *Receipts*

Received from applicants for examination.....	\$375.00
Received from re-examination fees.....	120.00
Received from renewal fees.....	1,840.00
Received from duplicate certificates.....	10.00
Miscellaneous .....	3.00
<b>Total Receipts.....</b>	<b>\$2,348.00</b>

#### *Expenditures*

Cash paid for compensation for commissioners.....	\$1,900.00
Cash paid for travel expenses.....	250.00
Cash paid for general office expense.....	667.87
<b>Total Expenses.....</b>	<b>\$2,817.87</b>

Respectfully submitted,

HOWARD C. DOANE, *Chairman*,  
 WALTER I. BROWN, *Secretary*,  
 GEO. S. HOUGHTON,  
 MATTHEW J. FOWLER,  
 SAMUEL W. BAKER.





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**ANNUAL REPORT**

OF THE

**BOARD OF REGISTRATION IN OPTOMETRY**

FOR THE

**YEAR ENDING NOVEMBER 30, 1930**

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DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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# The Commonwealth of Massachusetts

## REPORT

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION

BOARD OF REGISTRATION IN OPTOMETRY

STATE HOUSE, BOSTON, MASS.

To WILLIAM F. CRAIG, *Director of Registration*.

Sir:—The Board of Registration in Optometry has the honor to submit to you its nineteenth report, as required by Section 67, Chapter 112 General Laws.

The Board held its usual biannual examinations; in June and November. The total number of candidates examined was 49. Of this number 21 passed and 28 failed.

The following written examination was given June 24, 25, 26 and 27, 1930.

### ANATOMY

1. Discuss briefly the embryonic development of the eyeball and its appendages.
2. Describe the derivations, course and attachments of the extrinsic muscles.
3. Describe anatomically the uveal tract.
4. Locate and describe the primary visual centres.

### PHYSIOLOGY

1. Discuss the three phases of vision (a) physico-chemical, (b) physiological, (c) psychological.
2. Discuss the functions of the canal of Schlemm, Hyaloid canal, Hyaloid membrane.
3. Discuss physiologically the functions of the (a) iris, (b) ciliary body and processes, (c) conjunctiva, (d) lachrymal glands, (e) meibomian glands.
4. How is it that light stimulus brings about a reflex contraction of the pupil?

### PATHOLOGY

1. Differentiate an anterior polar cataract and central opacity of the cornea.
2. Discuss the symptoms and appearances of Iritis, Uveitis. What tissues are involved in each?
3. Describe in detail the ophthalmoscopic picture of (a) Arterio-Sclerosis, (b) Thrombosis of the central artery of the retina.
4. Describe or make a drawing of characteristic signs of glaucoma as determined by perimetry.

Answer three questions in each group. The tenth question may be selected from either group.

HOWARD C. DOANE, Opt.D.

### THEORETIC OPTICS

Answer five questions.

1. Two meniscus lenses A and B are taken from envelopes marked + 6.D. The front surfaces are + 12. and the back surfaces - 6; both are of 1.5 index but A is 3.4 mm. thick and B is 5.4 mm. thick. What is the actual difference in D. values?
2. Show by a diagram what takes place when (a) an oblique pencil of light passes through a DCX lens, (b) an axial pencil of light, the lens being 12 mm. in front of the apex of the cornea.

3. Draw a diagram of 3 positive (DCX, PL. CX and CX. meniscus) and 3 negative (DCC, PL. CC. CC. meniscus) lenses of equal D numbers. All lenses to be arranged with the vertex facing the eye and in the same plane. Show the position of the principal points in each and explain reason for position.

4. What results when a lens placed before an ametropic eye focuses an object at the P. R. exactly in the fovea.

5. A plano prism of  $6\gamma$  is mounted in a spectacle frame with its base apex line at axis 45. What prismatic power has it at 90 and 180?

6. Let A be the first and B the second lens of a combination of two thick convex lenses separated by an interval.

Let  $r_1$  and  $r_2$  be the radii of curvature of A, and  $r'_1$  and  $r'_2$  those of B.

Let  $t_1$  and  $t_2$  be, respectively, the actual thicknesses of A and B.

Let  $E_1$  and  $E_2$  be, respectively, the first and second equivalent points of A.

Let  $E'_1$  and  $E'_2$  be, respectively, the first and second equivalent points of B.

Let  $T_1$  and  $T_2$  be, respectively, the equivalent thicknesses of A and B.

Let  $F_1$  and  $F_2$  be, respectively, the focal lengths of A and B.

Let  $d$  be their distance apart, this being the distance between their most adjacent equivalent points, i.e. the distance between  $E_2$  and  $E'_1$ .

Let  $E$  and  $E'$  be, respectively, the first and second equivalent points of the combination.

Let  $F$  be the equivalent focal distance of the combination.

Let  $T$  be the equivalent thickness of the combination.

The equivalent focal distance  $F$  of two combined lenses is obtained from the formula

$$F = \frac{F_1 F_2}{F_1 + F_2 - d} = \frac{F_1 F_2}{N}$$

which is the same as for two thin lenses in combination.

The distance of  $E$  the first equivalent point of the combination measured from  $E_1$  the first equivalent point of A is

$$E = \frac{F_1 d}{F_1 + F_2 - d} = \frac{F_1 d}{N}$$

The distance of  $E'$  the second equivalent point of the combination measured from  $E'_2$  the second equivalent point of B is

$$E' = \frac{F_2 d}{F_1 + F_2 - d} = \frac{F_2 d}{N}$$

The distance  $T = E E'$ , between the equivalent points of the combination is determined by the following

$$T = T_1 + T_2 - d^2/N$$

Let  $r_1 = 10$  cm.,  $r_2 = 8$  cm.,  $t_1 = 2$  cm.,  $r'_1 = 9$  cm.,  $r'_2 = 7$  cm.,  $t_2 = 2$  cm.,  $\gamma = 1.5$  and  $d = 2.5$  cm.

Find  $F_1$  and  $F_2$ . Answer to be in cm.

WALTER IRVING BROWN, Opt.D.

#### PHYSIOLOGICAL OPTICS

1. Draw a cross section of an eye (a) when looking at a distant object; (b) when viewing a near object.

2. Show by graph Donders chart of static and maximum dynamic refraction from ages 10 to 80.

3. Tell what is meant by (a) light minimum, (b) light difference, (c) What law is approximately valid for all sensory impressions.

4. What visual functions take place under (a) photopic vision, (b) scotopic vision?



5. Describe what changes take place in Purkinje Samson's images during act of accommodation.

6. Of what advantage is it to have the pupillary opening where it is?

WALTER IRVING BROWN, Opt.D.

### THEORETIC OPTOMETRY

Answer ten questions only.

1. Differentiate between the Sheard and Tait method of Skiametry.

2. Under what conditions would you prescribe either Prisms or Bifocals to young myopes?

3. Differentiate between the findings with the Perimeter and Ophthalmoscope.

4. Describe the principals involved in the use of the Clason Visual Meter.

5. Discuss three types of Amblyopia and their possible correction.

6. Discuss the principals involved in the Slit Lamp and its uses.

7. What is meant by the study of Perimetry?

8. Under what conditions would you consider it advisable to use the perimeter?

9. Give the visual fields in their order beginning with the peripheral field and the average field limit of each color.

10. Discuss the principals involved in the use of the Stereo-Campimeter.

11. What condition of the eyes would justify fusional training?

12. Name the purpose of the Ophthalmometer giving the power, type, and refractory media in the telescope tube.

SAMUEL W. BAKER, Opt.D.

### PRACTICAL OPTOMETRY

Answer the following questions. Confine your answers to writing a prescription of your analysis of each, discussing your reasons for your procedure.

1. Patient 59 years of age. Retired. Symptoms, syphilis and general debility. Manifests  $5^{\circ}$  esophoria =  $5^{\circ}$  Right Hyperphoria at 20 ft.  $7^{\circ}$  Exophoria =  $7^{\circ}$  Right Hyperphoria at 14 inches. Dynamic Retinoscopy at 14 inches O.D. + 4.25 O.S. + 4.50. Trial case for distance O.D. + 1.75 = - .25 cyl. ax 90. O.S. + 2.00, addition for near + 2.50.

2. Patient 60 years old. Overseer. History, general run-down condition strongly suggesting toxemia. Dynamic Retinoscopy at 14 inches O.D. + 3.75 = - 1.00 ax 105 O.S. + 3.25 = - .50 ax 90. Trial case for distance O.D. + 1.00 = - 1.00 ax 105 O.S. + .50 = - .50 ax 90 = + 2.50 add for near +  $11^{\circ}$  Prism base up  $5^{\circ}$  Prism base out on O.D. =  $12^{\circ}$  Prism base down and  $5^{\circ}$  Prism base out on O.S. With this correction 20/40 O.D. 20/30 O.S. for distance. Binocular vision for near.

3. Patient age 58. Letter Carrier. History, slight injection O.U. with complaint of never having been comfortable with lenses. O.D. - 1.0 = - 1.75 cyl ax 105 O.S. - 3.50 = - 1.75 cyl ax 75. Add O.U. + 2.25 for near.  $7^{\circ}$  Exo. 20 ft.  $14^{\circ}$  Exo. 14 inches.

4. Patient 37 years of age. Teacher. History, Measles at 10 years, affecting O.D. which has turned out and become amblyopic, otherwise healthy. Requires + 5.00 O.D. = - 5.00 cyl ax 10. O.S. - 2.00 = - .50 cyl ax 180. Manifests  $1^{\circ}$  Right Hyper  $12^{\circ}$  Exo. at 20 ft.  $2^{\circ}$  Right Hyper  $15^{\circ}$  Exo. at 14 inches.

5. Patient 42 years of age. Housewife. History, dizziness in morning; gained some 12 pounds the last eight months, profuse gas in stomach throughout 24 hours, blood pressure about normal, indication of pelvic trouble. O.D. - .50 = - .50 cyl ax 180. O.S. - 3.00 = - .75 cyl ax 165. Manifests  $14^{\circ}$  Exo. at 20 ft.  $24^{\circ}$  Exo. at 14 inches.

6. Patient 14 years of age. Student. History, scarlet fever and measles at age 5 and 7. Static method at 1 metre O.D. + 4.00 = - 2.25 ax 150 O.S. + 5.50 = - 2.50 cyl ax 15. Dynamic at 14 inches O.D. + 3.50 = - 2.25 cyl. ax 150. O.S. + 5.25 = - 2.50 cyl ax 15. Trial case at 20 ft. O.D. + 2.25 = - 2.25 cyl ax 150. O.S. + 4.00 = - 2.50 cyl ax 15. Manifests  $6^{\circ}$  Left Hyper =  $8^{\circ}$  Exo. at 14 inches.  $3^{\circ}$  Left Hyper =  $2^{\circ}$  Exo. at 20 ft.

7. Patient 60 years of age. Printer. History, slight injection, print blurs at near, dizziness at times. Subjective for distance O.D. + .75 = - 2.00 cyl ax 90 O.S. + .25 = - 1.25 cyl ax 105 = + 2.25 add for near. Dynamic method at 1 metre O.D. + 1.75 = - 2.00 ax 85 O.S. + 1.25 = - 1.25 ax 105. Manifests 1° Left Hyper = 6° Exo. at 20 ft. 2° Left Hyper = 12° Exo. at 14 inches. Pupillary distance for near 57 Mille-metres Bifocal lenses.

8. Patient age 35. Housewife. Visual acuity 20 ft. without lenses O.D. 20/30 O.S. 5/200. Perfect health, slight frontal and back of eyes headache at times. Dynamic method at 15 inches O.D. + 3.25 = - .50 ax 180. O.S. + 7.50 = - 1.50 ax 135. Subjective cross-cyl at 20 ft. O.D. + 1.25 = - .50 ax 180. O.S. + 5.50 = - 1.50 ax 135. Vision O.D. 20/20. O.S. 20/100. Manifests 2° Eso. = ½° Left Hyper at 20 ft. Unable to read or sew with distant correction.

9. Patient 31 years. Housewife. Dynamic method at 15 inches O.D. - 2.50 = - 2.25 ax 180 O.S. - 2.00 = - 1.50 cyl. ax 180. Subjective Cross-cyl at 20 inches O.D. - 4.00 = - 2.25 ax 180. O.S. - 3.50 = - 1.50 ax 180. Manifests 4° Eso. = ½° Left Hyper at 20 ft. 4° Exo. and 1° Left Hyper at 14 inches. History, highly nervous otherwise healthy.

10. Patient 19 years. Stenographer. History, slight injection O.U. otherwise normal. Dynamic method at 15 inches O.D. - 4.50. O.S. - 4.5. Subjective cross-cyl at 20 ft. O.D. - 6.00 O.S. - 5.75. Manifests 8° Exo. at 20 ft. 15° at 14 inches.

GEORGE S. HOUGHTON, Opt.D.

### PRACTICAL OPTICS

1. (a) A finished lens, 40 m/m round, is four points thick in the center, at the edge it is seven points thick on the minus axis, and eleven points on the plus axis, index 1.523. What is the strength of the lens?

(b) How thick a blank would be necessary to grind the above lens, four points allowed for surfacing?

2. (a) White gold high bridge frame, fused bifocal lenses, pads cut on lower and inner edge. Reading lenses do not center being too low and too far out. How would you adjust?

(b) Describe your procedure in adjusting a finger piece mounting to a flat nose.

3. (a) How would you prevent a round lens from turning in a zylonite frame without shrinking the frame?

(b) What is the difference between 1/10th, 10K white gold filled frame, and a 10K white gold frame?

4. (a) A lens is decentered 4 m/m, and the prismatic deviation is 1½ (one and one half diopters). What is the power?

(b) Is there any difference in speed of machine in surface grinding and in polishing a lens?

5. (a) Give the curves of lenses and wafers in the following toric cement bifocals.

$$\begin{aligned} \text{O.D.} &= .50 + 1.00 \text{ cyl} \times 90 \\ \text{O.S.} &= .75 + .37 \text{ cyl} \times 130 \\ &\text{Add} + 2.25 \text{ sph. on.} \end{aligned}$$

(b) A patient requires an add. of + 1.75 D. sph., the reading glasses are toric.

$$\begin{aligned} \text{O.D.} &= + 1.50 \text{ sph.} - .50 \text{ cyl} \times 165 \\ \text{O.S.} &= + 2.25 \text{ sph.} - .50 \text{ cyl} \times 15 \end{aligned}$$

Write prescription for distance glasses.

6. Transpose the following lenses.

$$\begin{aligned} (a) &+ 2.75 \text{ sph.} - 1.75 \text{ cyl} \times 20 \\ (b) &- 2.00 \text{ sph.} - 1.12 \text{ cyl} \times 35 \\ (c) &= .87 \text{ cyl} \times 40 \supset - .75 \text{ cyl} \times 130 \\ (d) &+ 1.75 \text{ cyl} \times 70 \supset - .87 \text{ cyl} \times 160 \end{aligned}$$

7. Give type of frame, lenses and size of wafers if any, in each of the following cases.

(a) Banker, age 50, vision normal at distance, some desk work and must recognize people about in the bank.

(b) Housewife, age 62, needs glasses for sewing, ironing and playing cards.

(c) Newspaper editor, age 38, vision poor at distance and near, plays golf and goes to theatre considerably.

8. (a) Patient claims that sight is satisfactory at distance and reading at 14 inches when looking directly ahead, but everything blurs when the eyes are turned down at this same distance of 14 inches, when patient is working. How would you remedy the condition?

(b) Lady with long lashes and a flat nose has trouble with lashes touching lenses, and lenses being too low, the regular stock of zylonite frames do not fit, she will not pay for a special frame. How would you remedy the condition?

9. (a) What causes a rainbow in a cement bifocal? (b) The right lens of a finger piece mounting sets too low. How would you adjust it?

10. What is the dioptric value of the lenses? (a) 30 inches; (b) 18 inches; (c) 9 inches; (d)  $4\frac{1}{2}$  inches?

MATTHEW J. FOWLER, Opt.D.

The November examination was held on the 18th, 19th, 20th and 21st, with each member having the same examination subjects as in the June examinations.

During the year arrangements were made with the Boston City Optometric Clinic so that their quarters were made available for the practical examinations, and this, together with our own room at the State House greatly facilitated the practical examination of the applicants. The clinic being most thoroughly equipped with all modern instruments we were able to have field mapping done by every applicant, and thus a practical examination in every phase of modern practice was given by the Board.

The Board added a Kratometer to its equipment. This instrument has been greatly needed for some time and needs only the necessity of obtaining a luminous ophthalmoscope and retinoscope, stereocampimeter and perimeter to complete the instrumentation of our examining room at the State House.

The Board was requested to display its equipment at the Eastern States Exposition at Springfield and at the Commonwealth Armory, and to inform the public of its functions as a governmental department, in safeguarding the people of this Commonwealth against incompetent practitioners. The display at the Eastern States field in Springfield during September brought forth many compliments and we had the opportunity of distributing approximately 2200 pieces of descriptive literature and hundreds of people were given valuable information relative to the practise of Optometry and its regulations by this Commonwealth.

The display at the Exposition held in Commonwealth Armory from September 29th to October 12th was visited by several thousands and approximately 2000 pamphlets were distributed and the public was again enlightened as to the Board's functioning and the Optometry law. The board members were assisted in every way by practitioners in both cities, and during the entire periods some member of the Board was present.

His Excellency the Governor reappointed Dr. Matthew J. Fowler of Haverhill for five years, at the expiration of his term in September.

At the annual meeting of the Board, Dr. Howard C. Doane of Boston was elected Chairman and Dr. Walter Irving Brown of New Bedford was elected Secretary for the ensuing year.

During the year 21 persons qualified for registration by examination. One certificate was reissued under the five year suspension law and one Optometrist became reinstated following a hearing granted under section 71 or our law. One certificate was suspended for five years, eight certificates were revoked for non-payment of annual fees and three Optometrists died.

The Board held five hearings for complaints of violation of section 70, and one practitioner's certificate was suspended for ninety days.

## FINANCIAL REPORT

*Receipts*

Received from applicants for examination . . . . .	\$400.00
Received from re-examination fees . . . . .	130.00
Received from renewal fees . . . . .	1,838.00
Received from duplicate certificates . . . . .	10.00
Total receipts . . . . .	<u>\$2,378.00</u>

*Expenditures*

Cash paid for compensation for commissioners . . . . .	\$1,900.00
Cash paid for travel expenses . . . . .	599.92
Cash paid for general office expense . . . . .	415.52
Total expenses . . . . .	<u>\$2,915.44</u>

Respectfully submitted,

HOWARD C. DOANE, Opt.D., *Chairman.*  
 WALTER IRVING BROWN, Opt.D., *Secretary.*  
 GEORGE S. HOUGHTON, Opt.D.  
 SAMUEL W. BAKER, Opt.D.  
 MATTHEW J. FOWLER, Opt.D.

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**ANNUAL REPORT**

OF THE

**BOARD OF REGISTRATION IN OPTOMETRY**

FOR THE

YEAR ENDING NOVEMBER 30, 1931

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DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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## DEPARTMENT OF CIVIL SERVICE AND REGISTRATION BOARD OF REGISTRATION IN OPTOMETRY STATE HOUSE, BOSTON, MASS.

TO WILLIAM F. CRAIG, *Director of Registration*:

SIR:—The Board of Registration in Optometry has the honor to submit to you its nineteenth report, as required by Section 67, Chapter 112 General Laws.

The Board held 20 meetings including its usual biannual examinations. The examinations were held in June and November.

The following written examination was given November 17, 18 and 19, 1931.

### ANATOMY

1. Describe the tunics of the eyeball giving the embryonic derivation of each.
2. Trace the nerve fibres from the nasal half of each retina to the cuneus.
3. Discuss minutely the vascular system of the retina.
4. Describe the ciliary body and processes.

### PHYSIOLOGY

1. What is the function of the cells of the ciliary processes?
2. Discuss the functions of the third, fourth, sixth and seventh nerves.
3. Name five requisites for clear vision.
4. Discuss the antagonistic and associated actions of the extrinsic muscles.

### PATHOLOGY

1. What is the significance of (a) pulsating vein on the "disc" (b) pulsating of retinal veins (c) pulsation in retinal arteries.
2. Differentiate coloboma of optic nerve and glaucoma by means of ophthalmoscope and perimeter.
3. Describe ophthalmoscopic picture of detached retina and give histological changes that occur in the tissues involved.
4. Discuss etiology, symptoms and appearances of iritis, conjunctivitis and uveitis.

November, 1931.

HOWARD C. DOANE, Opt.D.

### PRACTICAL OPTOMETRY

#### CASE No. 1—20%

Analyse following case, cover each step in the examination.

Miss M. 12,053 white, age 16, 3rd year High School student. Health good. No illness or sickness since child. Visual acuity test at school this year showed vision below normal o.u. Has no previous Rx. Reads constantly. Mother noticed she got close to her books. Has to sit near screen at pictures to see clearly.

Naked V.A. O.D. .78 Pupils 7mm. o.u. Versions normal.  
O.S. .8

Pupillary reflexes to light normal both direct and consensual.

Pupillary reflexes to convergence accommodation normal.

Tension O.D. = 0

O.S. = 0

External, negative all.

Media Embrionic cataracts and feathery posterior YS. O.U. Otherwise negative.

Fundus, no pathology  $\pm$  average.

Covert test = No appreciable movement.

Corneal measurements O.D. 44.25 44.87; O.S. 44.25 45.25 with rule 90/180 o.u.

Static O.D.  $\pm$  0.25 sphere O.S.  $\pm$  0.12 sph.  $\pm$  .25 cyl. axis 90.

Dynamic  $\pm$  2.00 add to subjective o.u.

Subjective O.D. — 0.50 sphere; O.S. — 0.50 sphere  $\ominus$  0.25 cyl. axis 90.

Comparison O.D. 1.1 O.S. 1.1 Duochrome Red and green = c.u.

Tonicity, orthophoria both without and with Rx.

Ductions; add 8/7 abduction 6/5 supra 2.75 P.D. infra 2.25 P.D.

Accommodative convergence 2 P.D. base in.

Reserves break 16 P.D. IN. Recovery 15 P.D. IN.

Fields. Blind spot normal as to size and location.

Form and color not taken.

Fusion, Rapid, maintained steadily.

Stereopsis, Well developed.

### CASE No. 2—20%

Analyse following case, cover each step in the examination.

Mrs. F. 12465, white, age 27, at home. Present Rx 1 year, supra orbital ridge headaches. O.D. more severe. Health fair. Baby 3 months ago.

Naked vision O.D. 1.2 O.S. 1.15 Pupils average diameter. Versions normal.

Pupillary reflexes; to light: direct normal, consensual normal; Accommodative convergence, normal.

Tension      O.D. = 0  
                  O.S. = 0

External, negative.

Media; corneal nerves + distinct; probably had inflammation when young, as empty vascular system seen in various parts of cornea, rest negative.

Fundus: Upper nasal quadrant slightly hazy o.u., capillaries engorged macula o.u.

Coverttest; No appreciable movement.

Corneal measurements: O.D. 42.25/43. W.R. 105/15 O.S. 42/12/43 + W.R. 90/180

Static O.D. + 1.50 sph. + 0.25 cyl. axis 100 O.S. + 1.75 sph. + 0.50 cyl.  
axis 90.

**Dynamic** (O.D. + 1.50 add to subjective.

Dynamic (O.S. + 1.75 " " " "

Subjective O.D. + 0.37 sph. + 0.25 cyl. axis 100      O.S. + 0.50 sph. +  
.50 cyl. axis 85.

Comparison	O.D.	1.2	near smallest jaeger o.u.
	O.S.	1.2	

Tonicity 1/2  $\nabla$  esophoria without Rx 3  $\nabla$  exophoria with Rx.

Ductions add 6  $\nabla$  / 5  $\nabla$  abduction 6  $\nabla$  - 5  $\nabla$  supra 2.75 infra 1.75.

Accommodative convergence 7  $\nabla$  B. in.Subjective accommodation  $-3.50$  s.  $\pm$   $0.62$  s.

Blur,	Double,	Recovery.
8 $\nabla$ out	11 $\nabla$ out	1 $\nabla$ In
20 $\nabla$ in	25 $\nabla$ in	21 $\nabla$ In

Fields:

Fusion, occasional suspension. O.D. more frequently.

Stereopsis, Well developed.

5. How do you examine the pupillary reflexes? What do they indicate?



6. The subjective findings in a case were  $+2.00$  sph. o.u.  $2\Delta$  esophoria at distance and  $4\Delta$  Base out was required to align images at 33 c.m. (Displacement test  $6\Delta$  B Up before O.S.)

How would image position be changed (at 33c.m.) if a  $+1.50$  sph. were added to distance Rx total =  $+3.50$  sph. o.u.

7. How would you determine the existing condition of accommodation, (a) objectively; (b) subjectively.

8. How would you determine the existing relationship between A. accommodation and convergence. B. Fusion and convergence.

9. What findings would indicate normal relationship and abnormal relationship A and B; question No. 8.

10. Describe how you use the ophthalmoscope and what do you look for. Write in detail a hypothetical case report of ophthalmoscopic findings.

November, 1931.

WALTER IRVING BROWN, Opt.D.

### THEORETIC OPTICS

Answer all ten questions.

1. A candle flame is between two lenses A and B, light passing through A is focused on a screen two feet away 3 diameters. Light passing through B is focused on a screen 2 feet away 5 diameters. How far apart are the lenses, how far is the candle flame from each lens?

2. What is the focal length of a convex lens if an inverted image 10 times as long as the object is thrown on a screen 5 feet from the lens?

3. Give the formula for finding the index of refraction of a prism when the principal angle and the minimum angle of deviation is given?

4. A person holding a reading glass at the ordinary distance observes it magnifies 3 diameters. Give power of glass.

5. The focal length of a concave mirror is 15 inches. What will be the length of the image of a 6" arrow (a) 5" outside the focus; (b) 5" inside the focus; (c) give characters of both images.

### PHYSIOLOGICAL OPTICS

1. State number of factors that determine the resolving power of the eye.

2. How is the optical system of the eye compared to a camera, and how is it entirely different?

3. Discuss what is meant by the blur circle.

4. On what four factors does visual efficiency depend?

5. Why does a moving picture seem continuous when the screen is almost total darkness sixteen times a second? Why do we get the impression of motion from a series of pictures, each of which in reality is absolutely motionless. Why do the pictures have the appearance of depth when in reality they do not possess any objective third dimension?

November, 1931.

SAMUEL W. BAKER, Opt.D.

### THEORETIC OPTOMETRY

1. Why will a myope accept weaker powered minus lenses when he is examined subjectively with red test-letters than when he is examined with black test-letters?

2. Which in your opinion is better, and why; white letters on a black background or black letters on a white background?

3. Apply the following hyperopic terms in the cited case; facultative, manifest, relative, absolute and latent. Suppose the V.A. is 20/200 and becomes 20/20 with a plus 1.00 and is still 20/20 with a plus 3.00. With the dynamic findings the V.A. is 20/20 with a plus 4.00. (No allowance for lag.)

4. What imbalance would be induced in an orthophoric patient when a pair of three diopter prisms bases in are placed before each eye? Explain fully exactly what transpires.

5. What effect does refractive errors have upon the size of the normal field? Hyperopic, Emmetropic and Myopic? Explain by diagram.

6. What test would you employ to tell whether or not a patient is susceptible to fatigue? Explain in detail.

7. The central field of a patient has been destroyed by disease producing an absolute central scotoma. What are the optical principles involved in the use of the Perimeter.

8. Explain the use of the Well's Stereoscope for the correction of esophoria and exophoria?

9. Differentiate between "quantitative" and "qualitative" perimetry?

10. Why does a patient see the horizontal lines the darkest on the astigmatic chart in a case of astigmatism "against the rule", when the plus blurring sphere is before the eye? (Eye is made myopic in all meridians by plus blurring sphere). Supplement by diagram.

November, 1931.

CHARLES J. COLLINS, Opt.D.

### PRACTICAL OPTICS

1. The O.D. and O.S. are myopic, .75 dioptic in the horizontal meridian, and hyperopic 1.25 in the vertical meridian, and presbyopic 2.25D. What prescription and how would you make the glasses to fit the case?

2. (a) What would be the axis and kind of lens indicated in neutralizing if the movement of the lens was up and with? (b) Down and against? (c) In and with? (d) Out and against?

3. (a) How would you adjust a pair of spectacles that set 3m.m. too low, and the gold bridge cut in on the lower edge?

(b) The right lens is too high on a pair of zylonite spectacles and both lenses tilt out on lower edge?

4. (a) A rule held across the nose indicates that the lashes are 1 4 inch inside and the pupils 1 4 below. What dimensions of bridge would you give?

(b) How could you bend a bridge of the following dimensions

1/4 x 3/4 x 1/8 in. to make the following

1/16 x 1/2 x 1 8 in?

5. Which spherical lenses would you use to neutralize the following:

(a) + 62 sph. = - 1.75 cyl ax. 90

(b) - 62 cyl. ax. 180 = - .87 cyl. ax 170

(c) - 1.25 sph + .37 cyl ax 60

(d) + 1.50 cyl ax 30 = - .62 cyl ax 120

6. (a) How would you adjust a pair of fused bifocals regular zy. bridge, the near vision 4 m.m. too narrow, and the distance vision 6m.m. too narrow, without changing the frame?

(b) The right lens of an eyeglass is too low the left lens too high. Describe where and how you would adjust it?

7. (a) The left side of a nose is more prominent than the right, where and how would you bend a pair of eyeglasses so as to have the lenses equal distance from the lashes?

(b) The right is less prominent than the left side, where and how would you bend a pair of eye glasses so as to have the lenses equal distance from the lashes?

8. How can you tell without trial case or lens measure:

(a) a spherocylinder lens? (b) a plano prism? (c) a plano cylinder?

(d) Which increases the faster in surface grinding of kryptoks, the distance or reading (1) on outside, and (2) on inside?

9. (a) Supply the right distance lens in the following bifocal: distance

O.D. — — — — —

O.S. +62 sph. = — 1.12 cyl ax 115  
reading

O.D. + 1.50 sph. = + .87 cyl. ax 155

O. S. + 1.25 sph. = + 1.12 cyl ax .25

(b) How many m.m. would a + 3.75 sph. = +1.50 cyl. ax 180 be decentered to have a 2° prism base up?

10. (a) Describe how you would adjust a high bridge white gold frame the lenses set 4 m.m. too low, P.D. is correct?

(b) A High bridge frame, the lenses set 4 m.m. too high, P.D. is correct?

November, 1931.

MATTHEW J. FOWLER, Opt.D.

The June examination was held on the 23rd, 24th, 25th, and 26th. Twenty-nine candidates presented themselves and of this number fourteen were successful in obtaining certificates of registration. At the November examination, seventeen candidates were examined and six received certificates. This makes a total of thirty-six examined and twenty were granted certificates to practice.

There were four applications for reciprocity and one certificate was granted under Chapter 112, General Laws, section 68. Two certificates were suspended for period not to exceed five years, in accordance with Section 69. Six certificates were revoked for non-payment of annual registration fee.

During the year seven practitioners died.

His Excellency, the Governor, appointed Charles J. Collins of Boston, as a member of the Board for a period of five years, to take the place of Dr. George S. Houghton, whose term expired in September. At the annual meeting, Dr. Howard C. Doane of Boston was elected Chairman and Dr. Walter I. Brown of New Bedford was elected Secretary for the ensuing year.

The Board held three hearings on matters pertaining to revoked certificates, petitions having been received for reissuing revoked certificates. Also, three hearings were held for violations of Section 70.

Through the courtesy of the Boston Society of Optometrists, the Board was permitted to use the rooms and equipment of the Boston Optometric Clinic, to examine applicants in practical work. This aided greatly in the work and enabled the Board with the facilities at the State House, to complete the examination in three days.

A Ferre-Rand Perimeter was purchased by the Board, which adds to the equipment at the State House and adds greatly to the facility and thoroughness in the conduct of practical examinations. With the addition of a few more instruments, the equipment at the State House will be complete.

## FINANCIAL REPORT

*Receipts*

Received from applicants for examination	\$525.00
Received from re-examination fees	80.00
Received from renewal fees	1,832.00
Received from duplicate certificates	15.00
Received from High School examination	5.00
Total receipts	<u>\$2,457.00</u>

*Expenditures*

Cash paid for compensation for commissioners	\$1,900.00
Cash paid for travel expenses	599.90
Cash paid for general office expense	858.62
Total expenses	<u>\$3,358.52</u>

Respectfully submitted

HOWARD C. DOANE, Opt.D., *Chairman.*  
WALTER IRVING BROWN, Opt.D., *Secretary.*  
SAMUEL W. BAKER, Opt.D.  
CHARLES J. COLLINS, Opt.D.  
MATTHEW J. FOWLER, Opt.D.

The Commonwealth of Massachusetts

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1932

DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION





# The Commonwealth of Massachusetts

## DEPARTMENT OF CIVIL SERVICE AND REGISTRATION BOARD OF REGISTRATION IN OPTOMETRY STATE HOUSE, BOSTON, MASS.

TO MICHAEL ZACK, *Director of Registration*:

SIR: — The Board of Registration in Optometry has the honor to submit to you its twentieth report, as required by Section 67, Chapter 112 of the General Laws.

The Board, during its fiscal year ending November 30, 1932, held eighteen meetings, including its usual bi-annual examinations. The examinations were held in June and November. The following written examinations were given June 21, 22 and 23, and June 24 was devoted to the clinical determinations of each applicant's ability.

### ANATOMY

1. Give in detail all the parts of the eye and appendages that are formed from (a) the mesoderm; (b) the ectoderm.
2. Describe the development of the orbits.
3. Discuss the choroid, ciliary body and iris giving in detail their structure and vascular circulation.
4. Discuss the optic nerve giving minutely the distribution of the nerve fibers in the retina.

### PHYSIOLOGY

1. Discuss the functions of (a) the aqueous, (b) the vitreous, (c) conjunctiva and lacrimal apparatus.
2. Discuss briefly the physiology of visual acuity.
3. Describe the action of the extrinsic and intrinsic muscles.
4. Discuss the function of the following nerves: (a) trochlear; (b) ophthalmic division of the trifacial; (c) long and short ciliary; (d) motor-oculi; (e) abducens.

### PATHOLOGY

1. Describe the defects of the visual fields due to lesions of the temporal lobe.
2. Discuss (a) abnormal pupillary reactions; (b) nystagmus.
3. Describe the ophthalmoscopic picture of (a) arterio-sclerosis; (b) obstruction of retinal veins; (c) papilloedema; (d) renal retinitis.
4. Discuss glaucoma, acute and chronic, giving (a) symptoms; (b) external signs; (c) ophthalmoscopic indications and (d) progress of changes in the visual fields from the earliest stages.

June, 1932.

HOWARD C. DOANE, Opt.D.

### PRACTICAL OPTOMETRY

Answer all questions.

1. How do you obtain an accommodation convergence finding? Illustrate by six various types of cases.
2. What type of accommodation convergence findings are indicative of dangerous condition.
3. What do the findings of Positive and Negative Fusional Convergence indicate? Describe how findings may be obtained.
4. Describe fully the making of an external examination and report same.
5. Describe three simple methods of determining the existence of Glaucoma. What one will you use in every case?
6. What are the important conditions to be studied in an Ophthalmoscopic examination? What conditions should obtain in a non-pathologic case?

### CASE No. 1 — 20%

J. N. — Male 30. Unmarried. Textile mill superintendent. Glasses worn two years. Dr. C's Rx. Finds himself scowling frequently and people have informed him of this condition. Eyes bother especially when doing close work, greater discomfort when he is transferring from one book to another.

Pupils; large: reactions negative.

External examination negative.

Media; embryonic remnants o.u.; otherwise negative.

Fundus; O.D. non-pathologic; O.S. non-pathologic.

Static; O.D. — .25 sph.  $\odot$  + .50 cyl. axis 90

O.S. + .25 sph.  $\odot$  + .50 cyl. axis 90

Subjective; — .75 + .50 ax 90. V.A. = 1.2 o.u.

— .37 + .50 ax 90.

Tonicity; without Rx 1  $\nabla$  esophoria. With subjective findings 1/4  $\nabla$  exophoria and isophoria.

Ductions; ADD. 21/12°

ABD. 7/5°

Fusion Convergence 6  $\nabla$  Base In.

Pos. Fus. Res. 10/5  $\nabla$

Neg. Fus. Res. 11/8  $\nabla$

Fusion. Rhythmic alternation, when viewing F-L charts sees F; L; E; continuously.

What findings are lacking in above case report?

Give complete analysis and your advice and recommendations to patient.

### CASE No. 2 — 20%

H 13329. White. Male. Age 43. Tire salesman.

History: Eyes tire quickly. Head feels heavy after days work. Drives long distances every day. Reads large amount, plays contract several nights a week. No glasses used since in high school.

N.V.A. O.D. 1.2 Versions normal. Pupils average size and shape.

O.S. 1.2

Direct, consensual and accommodation convergence — reflexes normal.

External O.D. Negative. O.S. Negative.

Media O.D. Negative O.S. Negative.

Fundus; no pathologic. Fill out as necessary in making record of fundus conditions.

Ophthalmometer.	O.D. 43.75D	45	O.S. 43.62D	135
	44.75D	135	44.62D	45

Static O.D. + .50 + .37 ax 45

O.S. + .50 + .37 ax 135

Dynamic 15"; + 1.50 add to subjective findings

Subjective; O.D. What would expect for Rx?

O.S.

Comparison 1.2 Either monocularly or binocularly; letters in green area Duo.

1.2 Chrome test, slightly clearer than those in red.

Tonicity; orthophoria.

Ductions; ADD 4/0  $\nabla$ ; ABD 7/3  $\nabla$ ; Supra 3  $\nabla$ ; Infra 3  $\nabla$ .

Fus. Conv., 13"; 10  $\nabla$  Base in. Accommodation Convergence. Fill in.

Neg. Fus. Res.; 10/7  $\nabla$ . Pos. Fus. Res.; 7/2  $\nabla$

Fusion; Fine.

Stereopsis; Well developed.

Add any findings that should be reported in this case.

Case analysis.

June, 1932.

WALTER IRVING BROWN, Opt.D.

### THEORETIC OPTICS

Answer all ten questions.

1. Explain some one experimental way for measuring the velocity of light.

2. The focal lengths of objective and eyepiece of a compound microscope are 18 mm. and 25 mm. respectively. When the object is placed 20 mm. from the objective, the real image is formed 23 mm. from the eyepiece. Find the magnifying power of the microscope?

3. An object is placed 30 cm. in front of a convex mirror, the focal length of which is 40 cm. (a) Where will the image be? (b) Where should the object be placed to produce a real image.



4. Give the index of refraction of a lens whose focal length is 24 c.m. and whose curves are + 6.00 and — 12 c.m., respectively.

5. A simple magnifying glass is held 3 in. from a small object and it magnifies 6 diameters. What is the radius of curvature of the lens?

### PHYSIOLOGICAL OPTICS

1. Since the optical system of the eye being chromatic, explain why we do not see color fringes around lights.

2. Describe and state the function of each of the three areas in the retinal field.

3. Why does the sun appear yellowish-white when viewed through red glass when red glass allows only red rays to pass through it?

4. Why in weak illumination is the light sense of the macula less acute than the surrounding area?

5. A myope of 1.D., a hyperope of 1.D., and an emmetrope see clearly the same object at 1 M., distance. What would be the comparative size of the retinal image in each case.

June, 1932.

SAMUEL W. BAKER, Opt.D.

### THEORETIC OPTOMETRY

1. Explain and diagrammatically illustrate, by use of the Maddox rods, plus and minus cyclophoria. Give reasons for all observations.

2. Why in a case of amblyopia exanopsia is a rhythmical exposure of the eyes alternately to light and darkness of good physiologic value?

3. How is it possible to employ dynamic skiametry without the use of lenses in a case of hyperopia, myopia and enmetropia? Give an example to illustrate each using a hypothetical case.

4. What subjective test would you use to determine whether or not the axis of the monocular cylinder will be comfortable binocularly?

5. What is the law of reciprocal innervation?

6. Define and illustrate (a) tonic convergence; (b) accommodative convergence; (c) fusional convergence.

7. Diagrammatically illustrate and explain why the central spot on the stereocampimeter slate appears further away than the plane of the slate?

8. How could you account for the fact that less plus is sometimes found by dynamic skiametry than by static skiametry?

9. What importance is there in recording the following findings when taking the near negative relative convergence:

(a) first blur. (b) doubling. (c) recovery.

10. Give ten reasons why an optometrist would be lead to chart a patient's visual fields. (Pathology will be considered as only one reason.)

June, 1932.

CHARLES J. COLLINS, Opt. D.

### PRACTICAL OPTICS

1. In surface grinding a pair of toric lenses, the following surface tools are used: O.D. — 6.00 combined with — 7.00 for outside curve, and + 4.75 for inside curve. O.S. — 6.00 combined with — 6.50 for outside curve, and a + 6.50 for inside curve. Write the prescription.

2. A Kryptok is ground with the reading portion on center and the combination is a sphero cylinder. Could the lens be so cut as to set the reading in or out 2 mm.?

3. (a) How would you raise or lower the lenses in a finger piece mounting? (b) Why is it possible to use a longer lens with a spectacle frame than with a finger piece mounting?

4. Using spherical lenses for neutralizing, which lenses would you use to neutralize the following:

(a) — 0.62 cyl. axis 90 = + 1.25 cyl. axis 180.  
(b) + 1.50 sphere = — 1.75 cyl.  
(c) — 1.00 sphere = — 0.62 cyl.  
(d) + 0.87 sphere = + 0.87 cyl.

5. (a) A patient drops an oval flat lens from his eye glass and puts it back with the cylinder on the wrong side. What change is there in the lens?

(b) One side of a frame on a patient is much farther away from the eye than the other. How would you adjust it to make it perfectly straight across?

6. (a) An unknown lens requires a + 4.00 sphere to neutralize the vertical meridian, and a - 2.00 sphere to neutralize the horizontal meridian. Write three forms of prescription.

- (b) + 2.50 = + 0.50 cyl toric.  
 + 3.00 = + 0.75 cyl flat.  
 + 1.75 = + 0.25 cyl toric.  
 add + 2.00 on the first.  
 add + 2.25 on the second.  
 add + 1.75 on the third.

What are the curves on the wafers?

7. (a) By mistake a wafer is cemented to the cylinder side of a flat lens. What happens to the reading portion of the lens?  
 (b) We want to add a + 0.50 sphere to the distance on a finished Kryptok. In so doing what change will take place to the reading portion?
8. (a) Give brief explanation of the saddle bridge system of measurements.  
 (b) Give explanation of your method of procedure in taking measurements for a pair of spectacles.
9. (a) Can a cylinder lens be decentered in more than one meridian?  
 (b) 1. What is an axometer? 2. What is a protractor?
10. (a) Describe the following frames:  
 1. White Gold. 2. Gold Filled. 3. Gold Plated.  
 (b) Patient requires N 2 1/2, bridge, for spectacle, P.D. 62 mm. What size finger piece mounting and lenses would you prescribe?

June, 1932.

MATTHEW J. FOWLER, Opt.D.

At the June examinations there were 31 candidates taking the examinations: —  
 20 of whom were taking their first examinations;  
 27 took the examination in Anatomy, Physiology and Pathology;  
 29 in Practical Optometry;  
 29 in Theoretic and Physiological Optics;  
 28 in Theoretic Optometry;  
 27 in Practical Optics; and  
 31 took the Clinical examination.

There were four successful in passing this examination. The sum of \$555 was collected from applicants.

At the November examinations there were 23 applicants, four appearing for initial examinations: —

- 6 took the examination in Anatomy, Physiology and Pathology;  
 12 in Practical Optometry;  
 19 in Theoretic and Physiological Optics;  
 13 in Theoretic Optometry;  
 6 in Practical Optics; and  
 15 took the Clinical demonstration examination.

There was one successful candidate. The sum of \$130 was collected.

There were four applications for reciprocity under Section 68, of Chapter 112 of the General Laws. Only two met the requirements; these were given clinical examinations and both were successful and granted certificates.

The total number examined during the past year was 56, of these seven were successful and granted certificates.

His Excellency, Governor Ely, made no reappointment when Dr. Howard C. Doane's term expired in September.

At the annual meeting, Dr. Howard C. Doane of Boston was reelected Chairman and Dr. Walter Irving Brown of New Bedford was elected Secretary for the ensuing year.

The Board held one hearing for violation of Section 70, which resulted in a suspension of ninety days. The Board held three hearings to consider the advisability of renewing the right to practice of three registered optometrists who had their right to practice revoked, under Section 71, Chapter 112, General Laws. Two

petitioners were granted renewals and one petition was denied. The Board investigated eight complaints; no legal action was taken as all agreed to comply with the law when it was explained to them.

The Board again was privileged to use the facilities of the Boston City Society of Optometrists in giving the clinical demonstration examinations.

The needed Stereo Campimeter was added to our equipment at the State House. This now completes the instruments needed to give a thorough examination in field plotting.

### RECOMMENDATIONS

The Board made the following recommendations relevant to legislation.

For some time the Board has realized the necessity for certain changes in the law relating to the practice of optometry and is therefore recommending changes in chapter 13 and also 112 of the General Laws. The reasons for these changes, in the opinion of the Board, are as follows:

The law at present does not specifically provide for the appointment of members to fill unexpired terms.

It has been found difficult to meet on the second Tuesday of October in each year. The annual meeting should be held in the month of October, but other meetings should be held as the Board determines or upon call of the chairman.

The definition of the practice of optometry should be made more specific and definite.

The power of the Board to make rules and regulations should be extended to apply to the practice of optometry, such rules to be in keeping and not inconsistent with the provision of the law governing the practice of optometry.

It is necessary that the educational requirements be raised in conformity to the standards required by other States and advances made in professional optometric education.

There should be more specific regulations in regard to the recording of certificates of registration, in order that the location of registered optometrists may be definitely determined at all times.

### FINANCIAL REPORT

#### *Receipts*

Received from applicants for first examination .....	\$600.00
Received from re-examination fees .....	85.00
Received from renewal fees .....	1,840.00
Received from back fees .....	4.00
Fines .....	5.00
Received from reciprocity examination .....	50.00
Miscellaneous .....	.10
Total receipts .....	\$2,584.10

#### *Expenditures*

Cash paid for compensation for commissioners .....	\$1,900.00
Cash paid for travel expenses .....	482.38
Cash paid for general office expenses .....	466.02
Total expenses .....	\$2,848.40

Respectfully submitted,

HOWARD C. DOANE, Opt.D., *Chairman.*  
 WALTER IRVING BROWN, Opt.D., *Secretary.*  
 SAMUEL W. BAKER, Opt.D.  
 CHARLES J. COLLINS, Opt.D.  
 MATTHEW J. FOWLER, Opt. D.



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ANNUAL REPORT

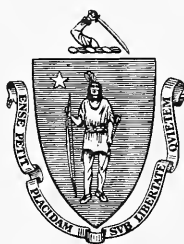
OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1933

DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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# The Commonwealth of Massachusetts

DEPARTMENT OF CIVIL SERVICE AND REGISTRATION  
BOARD OF REGISTRATION IN OPTOMETRY  
STATE HOUSE, BOSTON, MASS.

To MICHAEL ZACK, *Director of Registration*:

SIR:—The Board of Registration in Optometry has the honor to submit to you its twenty-second report, as required by Section 67, Chapter 112 of the General Laws. The Board, during its fiscal year ending November 30, 1933, held twenty-three meetings including its usual bi-annual examinations. The examinations were held in June and November. The following written examinations were given November 27, 28 and 29.

## ANATOMY

1. Describe the normal anatomy of the conjunctiva.
2. Discuss the construction and composition of the Vitreous.
3. Describe the course of the Trigeminal nerve to the eye.
4. Name and locate the extrinsic muscles of the eye.

## PHYSIOLOGY

1. Discuss the physiological reactions of the pupil.
2. What is the function of the vascula system of the retina?
3. Give the functions of (a) the cornea; (b) the aqueous; (c) the iris; (d) the lens; (e) the ciliary body and processes.
4. Discuss physiologically binocular single vision.

## PATHOLOGY

1. Discuss the prodromal symptoms of glaucoma.
2. Discuss the behavior of the pupil in diseases of the eye.
3. What ocular troubles are caused by tumors of the pons Varolii?
4. Discuss scintillating scotoma.

Answer three questions of each group. The tenth question may be selected from any group.  
November, 1933.

JOHN E. CORBETT, Opt.D.

## PRACTICAL OPTOMETRY

Answer ten questions.

1. What information should be sought in history taking? Why?
2. How are fusion convergence findings obtained? Interpret possible findings.
3. If a patient has an abduction of  $12^\nabla$  and an induction of  $16^\nabla$ , what is probable cause? Explain how correction should be accomplished.
4. Explain optometric procedure in alleviation of divergent strabismus. Give reason for each phase of practice.
5. How does a pupil of 1mm. diameter effect retinoscopic findings?
6. When convergence is excessive due to accommodative relationship, what results?
7. Interpret tonicity findings and upon whose teaching your reasoning is based.
8. Explain use of cross cylinder: 1. For determining power of Rx; 2. Location of axis in an astigmatic case.
9. How can latent hyperopia be ascertained?
10. Explain the practical application of ophthalmometer findings.

November, 1933.

WALTER IRVING BROWN, Opt.D.

## THEORETIC OPTICS

Answer all ten questions.

1. An opera glass has a + 12.50 D. object glass and a — 25 D. eye piece. How far apart must the lenses be, so that a + 5. D. hyperope sees clearly through them without using accommodation?

2. Two mirrors, No. 1 placed horizontal, No. 2 inclined at an angle of  $135^\circ$  and touching the side of No. 1, and an object is placed  $15^\circ$  above mirror No. 1. How many images would an observer see half way between the mirrors and in what position see more?

3. Discuss primary and secondary rainbows. Show graphically how bows are formed.

4. Four 25 watt electric bulbs in a cluster give sufficient illumination on a book held 6 feet away. How many bulbs would be required to give the same illumination 9 feet away?

5. A photographer wishes to purchase a lens from you that will produce an image one-twelfth as tall as the object when placed at 13 feet from the plate. What is the focal length of the lens and how long must the bellows be?

#### PHYSIOLOGICAL OPTICS

1. Give positions of the seven images of the eye.
2. Discuss what is meant by astigmatism by incidence.
3. Discuss the phenomena of optic illusions.
4. What effect do cylindrical lenses have on the size of retinal images?
5. What is the most effective refracting media of the eye? Give reasons.

November, 1933.

SAMUEL W. BAKER, Opt.D.

#### THEORETIC OPTOMETRY

1. How may the cross cylinder be employed to determine whether or not a monocularly correct Rx will be correct binocularly?

2. Give several reasons to show that accommodation and convergence are two individual functions. Wherein are they associated?

3. Explain the method of determining the final presbyopic addition by dynamic skiametry?

4. Give at least three reasons why it is preferable to take ductions with prisms over both eyes rather than prisms over one eye?

5. Patient age 30 — by skiametry with observation at 13 inches and fixation variable the following lens combination gives neutrality. Plus 1.25 ( ) plus 1.25 x 95. The ametropic correction is minus .50 ( ) minus 1.25 x 5. Where must fixation be in order that the + 1.25 ( ) + 1.25 x 95 may give neutrality?

6. How would you account for the effect of a plus correction, in some cases increasing the amount of base in prism overcome at distance, while in other cases there is a decrease in the amount of base in prism overcome at distance?

7. Explain why it is advocated to use the cover test in conjunction with the Maddox rod test? Explain the technique employed.

8. Explain fully and illustrate by a hypothetical case how it is possible during the subjective fog test, when vision is fogged to the extent of 50% and attention is called to the astigmatic chart two sets of lines appear the blackest and they are at right angles from one another. How would you proceed?

9. (a) Name two factors that determine the power of the cross-cylinder to be employed in a given case. (b) How may the cross cylinder be employed to measure the positive and negative relative convergence?

10. Discuss the three principal theories for the etiology of strabismus.

November, 1933.

CHARLES J. COLLINS, Opt.D.

#### PRACTICAL OPTICS

1. (a) How many mm. below center would you mark a Kryptok to have a 14 mm. high reading in a 42 mm. frame? (b) What three lenses could you use to surface grind a — 2.50 sph. + 5.50 wafer?

2. Give type of lenses, style of frame, size of wafer, if any, in the following cases:

(a) Stock broker, age 50, general office work on desk, and stock board.

(b) Teacher, age 30, cannot see clearly about school room.

(c) Grocer, age 42, cannot see to make out bills or look up telephone numbers.

3. Rx ground in bifocal lenses set too high, explain three ways of lowering them.



What is known as a 47 bend?

4. How would you adjust a pair of glasses of a patient, high bridge spectacles, the right eye is 3 m. nearer the nose than the left?

Patient has one eyebrow running much higher than the other, the eyes on same level. How would you adjust?

5. A lens measure shows the following:

(a) outside curve  $+ 6.00$  and  $+ 7.50$

inside curve  $- 4.25$

(b) outside curve  $+ 9.25$  and  $+ 8.25$

inside curve Plano.

State the powers.

6. (a) An unknown lens requires  $- 1.75$  to neutralize the vertical meridian, and a  $+ .75$  to neutralize the horizontal meridian. Write the prescription.

(b) Which spherical lenses would you use to neutralize the following:

(a)  $- .75$  cyl  $\times 100 = - .87$  cyl  $\times 10$

(b)  $+ .87$  cyl  $\times 45 = - 1.25$  cyl  $\times 135$

(c)  $- .37$  sph.  $= + .62$  cyl.

7. (a) A bifocal lens requires  $- 2.25$  sphere and a  $- 3.75$  sphere to neutralize the distance lens, a  $- .50$  sphere and a  $- 2.00$  sphere to neutralize the near. Write the prescription.

(b) How can a spherical prescription be transposed?

8. (a) In the following prescription supply the right distance lens:

O. D.

O. S.  $+ .62 = - .87 \times 180$

O. D.  $+ 1.25 = + .62 \times 90$

O. S.  $+ 1.75 = + .87 \times 90$

(b) What is the Dioptric value of the following lenses combined?

$+ .75$  cyl  $\times 180 = - 1.25$  cyl  $\times 90$

$+ 2.00$  cyl  $\times 90 = + 1.25$  sph.

$+ 1.75$  sph.  $= - .75$  cyl  $\times 180$

$- .87$  sph.  $= + 1.62$  cyl  $\times 180$

9. (a) What term is applied to the lesser curve of a toric surface?

(b) Which lens has the deeper inside curve:

$+ 4.50 = + .75$  cyl  $\times 90$  Toric 6 Base, or

$+ 4.75$  PCX.

10. It is desired to decenter a  $+ 3$  sph. an amount sufficient to give the equivalent of a  $1^\circ$  prism base in, the finished lens is to be 39 mm. long. What is the minimum size of blank from which such a lens can be cut?

November, 1933.

MATTHEW J. FOWLER, Opt.D.

At the June examinations there were 38 candidates taking the examinations:—

21 of whom took their first examinations;

24 took the examination in Anatomy, Physiology and Pathology;

26 in Practical Optometry;

34 in Theoretic and Physiological Optics;

30 in Theoretic Optometry;

25 in Practical Optics;

28 took the Clinical demonstration examination

There were three successful in passing this examination. The sum of six hundred dollars (\$600) was received from examination fees.

At the November examinations there were 45 candidates, eleven appearing for their first examinations:—

30 took the examination in Anatomy, Physiology and Pathology;

32 in Practical Optometry;

41 in Theoretic and Physiological Optics;

36 in Theoretic Optometry;

31 in Practical Optics;

6 took the Clinical demonstration examination.

There were seven successful candidates. The sum of three hundred and fifty dollars (\$350) was received in examination fees.

There were two applications for reciprocity and the Board rejected both.

The total number examined during the past year was 83, seven of whom were successful and granted certificates of registration.

His Excellency, Governor Ely, appointed Dr. John E. Corbett of Boston on December 21, 1932, to succeed Dr. Howard C. Doane of Boston, who had been a member of the Board since 1917, serving as Secretary from 1917 to 1925, and as Chairman since 1925. Doctor Doane, as a member of the Board of Registration in Optometry, had rendered a most valuable service to the Commonwealth and his profession.

Dr. Samuel W. Baker was elected to serve as Chairman until the next annual meeting of the Board.

At the annual meeting Dr. Charles J. Collins of Boston was elected Chairman and Dr. Walter Irving Brown of New Bedford was re-elected Secretary for the ensuing year.

The Board held twelve meetings during the year and granted hearings of eleven violations of the Optometry Law. Six certificates were suspended as a result of these hearings.

Five certificates were revoked for non-payment of renewal fees and five were cancelled due to decease of registrant.

One certificate was reissued, making a net loss of one registration for the fiscal year.

Four requests for suspension of license in accordance with section 67 of chapter 112 of the General Laws were granted.

There were two applications received requesting registration by reciprocity, which were denied.

An Ophthalmometer and Ophthalmoscope were added to the equipment used in the clinical demonstration.

The Boston City Society of Optometrists again graciously donated the use of their clinic and its entire facilities for the conduct of the clinical examinations.

#### RECOMMENDATIONS

The Board made the following recommendations relevant to legislation.

For some time the Board has realized the necessity for certain changes in the law relating to the practice of optometry and is therefore recommending changes in chapter 13 and also chapter 112 of the General Laws. The reasons for these changes, in the opinion of the Board, are as follows:

The law at present does not specifically provide for the appointment of member to fill unexpired terms.

It has been found difficult to meet on the second Tuesday of October in each year. The annual meeting should be held in the month of October, but other meetings should be held as the Board determines or upon call of the chairman.

The definition of the practice of optometry should be made more specific and definite.

The power of the Board to make rules and regulations should be extended to apply to the practice of optometry, such rules to be in keeping and not inconsistent with the provision of the law governing the practice of optometry.

It is necessary that the educational requirements be raised in conformity to the standards required by other States and advances made in professional optometric education.

There should be more specific regulations in regard to the recording of certificates of registration, in order that the location of registered optometrists may be definitely determined at all times.

This recommended legislation was passed by the House of Representatives, but was referred to the next Legislature by the Senate.

## FINANCIAL REPORTS

*Receipts*

Received from applicants for first examination.....	\$800.00
Received from re-examination fees.....	150.00
Received from renewal fees.....	1,812.00
Received from back fees.....	4.00
Fines .....	15.00
Duplicate certificates.....	10.00
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Total receipts.....	\$2,791.00

*Expenditures*

Cash paid for compensation for Board members.....	\$1,773.40
Cash paid for travel expenses.....	558.50
Cash paid for general office expense.....	606.38
<hr/>	
Total expenses.....	\$2,938.28

Respectfully submitted,

CHARLES J. COLLINS, Opt.D., *Chairman.*  
WALTER IRVING BROWN, Opt.D., *Secretary.*  
SAMUEL W. BAKER, Opt.D.  
JOHN E. CORBETT, Opt.D.  
MATTHEW J. FOWLER, Opt.D.



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## ANNUAL REPORT

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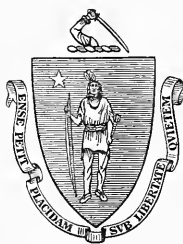
## BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1934

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DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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# The Commonwealth of Massachusetts

## DEPARTMENT OF CIVIL SERVICE AND REGISTRATION BOARD OF REGISTRATION IN OPTOMETRY STATE HOUSE, BOSTON

TO HONORABLE JAMES J. SUGHRUE, *Director of Registration*:

SIR:—The Board of Registration in Optometry has the honor to submit to you its twenty-third annual report as prescribed by section 67 of chapter 112 of the General Laws.

The Board during its fiscal year ending November 30, 1934, met on twenty days. These meetings included hearings and bi-annual examinations. Examinations were held on June 11 to 13 inclusive and November 19 to 21 inclusive. The following questions were asked under their respective subjects at the June examination:

### ANATOMY

1. Describe the normal anatomy of the retina.
2. Trace the optic tract — "either by description or diagram."
3. Describe the anatomy of the normal lens.
4. Describe the iris.

### PHYSIOLOGY

1. What are the physiological relations of the trigeminus to the eye?
2. Discuss physiologically the nerves of the eye.
3. Discuss the function of each conjugate brain centre controlling the ocular muscles.
4. Discuss the vascular system of the eye.

### PATHOLOGY

1. Discuss Trachoma.
2. Discuss orbital Cellulitis.
3. Discuss the pathology of glaucoma.
4. Describe the diagnostic signs of pareses of the extrinsic muscles of the eye.

Answer three questions in each group. The tenth question may be selected from either group.

June, 1934.

JOHN E. CORBETT, Opt. D.

### PRACTICAL OPTOMETRY

1. What are the essential findings in an investigation of the visual functions?
2. How is each of these findings obtained?
3. What may they be?
4. How is each one interpreted?
5. How can one determine objectively that bifocals are necessary?
6. What distance from the vertex of the cornea should one place the back surface of the lenses in either spectacles or eyeglasses? Why? Explain fully what changes from this position do to the size of the retinal image. What would be the results of these changes?
7. Describe briefly the technique of fitting telescopic spectacles.
8. For what purpose are eisikonic lenses prescribed?
9. Describe a method of developing the abduction.
10. Describe in detail how one should make a color perception investigation with Holmgren yarns. What findings would indicate red-green blindness?

June, 1934.

WALTER IRVING BROWN, Opt. D.

### THEORETIC OPTICS

Answer all ten questions.

1. Two parallel plane mirrors A and B face each other at a distance of three feet. A small object, black on one side, white on the other, is placed between them one foot from A with black side facing it. Give the distances from each mirror of the second and third images reflected in them, and how they face each mirror.

2. What is the magnifying power of a convex lens 3 cm. in focal length for a nearsighted eye whose near point is 12 cm?

3. When an object is placed 80 cm. from the center of curvature of a concave mirror and it is found that the distance of the image from the mirror is doubled by bringing the object 20 cm. nearer the mirror, what is the focal length of the mirror?

4. A ray of light impinges on a slab of rock crystal, whose index is 1.545. What must be the angle of incidence in order that the reflected ray may be perpendicular to the refracted ray?

5. An erect image, one-fourth the height of the object, is formed by a mirror; if the distance of the object is nine inches, what is the radius of curvature of the mirror?

#### PSYCHOLOGICAL OPTICS

1. Why, in cases of high hyperopia, are small objects seen better nearer the eye than at some distance, resembling a myopic condition?

2. What visual angle is subtended by a six inch bullseye on a target at 200 yards? How far from the center will a shot strike if an error of a quarter of a degree is made in sighting?

3. Explain why it is that when the sun or moon is reflected in the sea a long band or streak of light is seen instead of a clear image.

4. How would the sizes of the retinal images compare in an emmetrope, a myope of 3D. and a hyperope of 3D. looking at an object at one-third of a meter?

5. If you could construct a perfect human eye, would you place the pupil in the position it now occupies, or elsewhere? Give reasons.

June, 1934.

S. W. BAKER, Opt. D.

#### THEORETIC OPTOMETRY

1. With a plus 3 diopter lens before the static eye, where will the neutral point in the horizontal and vertical meridians be located for the ametropes whose correction is + 1 D sph. = 1 D cyl. axis 90°?

2. When may the estimated correction in the use of cross cylinders be assumed to be correct?

3. Which in your opinion is better, and why? White letters on a black background, or black letters on a white background?

4. Describe various ways in which dynamic skiametry may be applied.

5. What particular points in regard to the fusional faculty can and do cause considerable ocular discomfort?

6. (A) Describe the perimeter. (B) What does it measure?

7. Why in a case of amblyopia exanopsia is a rhythmical exposure of the eyes alternately to light and darkness of good physiological value?

8. (A) Explain and diagrammatically illustrate by use of the Maddox rods, plus and minus cyclophoria. (B) Give reasons for all observations.

9. A patient while wearing -2D sph. lenses under the dynamic test neutralizes the shadow movement during fixation up to 40 cm. Give his amplitude of accommodation and the distance of his near point.

10. What are the effects of the extrinsic muscles on the relation of the visual lines of the two eyes?

June, 1934.

CHARLES J. COLLINS, Opt. D.

#### PRACTICAL OPTICS

1. (A) Patient has P.D. 62 in right eye, 3 mm nearer the nose than left eye, spectacle frame, high bridge, bifocal lenses. How would you adjust?

(B) Nose protrudes out on left side, and in on right side. How would you adjust a pair of eye glasses?

2. (A) Patient with flat nose, high bridge frame, eye lashes touch. How would you adjust?

(B) Spectacle frame projects out on left side, and right is too low. How would you adjust?

3. (A) A lens measure set for an index of 1.52 shows one side = 1.25 sphere, the other + 2.75 sphere, the glass has an index of refraction of 1.62. What is the strength?

(B) A -4.00 sphere is decentered  $4\frac{1}{2}$  mm. What is the prism value?

4. (A) A compound lens with the axis of cylinder set between 90 and 180. State how you would determine by looking through at cross bars of window, that the axis was not between 0 and 90.



(B) The centers of each lens of a pair of + 5.00 spheres are 2 mm. from centers of pupils, they are in a G. F. spectacle frame. Would you grind new lenses and decenter?

5. (A) Using one spherical lens at a time, neutralize the following lenses:

- (a) — 0.37 sph = + 1.25 cyl x 90
- (b) — 0.75 cyl x 45 = + 2.25 cyl x 135
- (c) + 0.87 sph = + 0.62 cyl x 80
- (d) + 0.50 cyl x 90 = + 1.25 cyl x 180

- (B) Transpose the following:

- (a) + 4.50 sph = — 1.25 cyl x 90
- (b) — 0.75 sph = — 0.62 cyl x 30
- (c) — 0.50 cyl x 50 = + 0.75 cyl x 140
- (d) + 0.87 sph = + 0.62 cyl x 20

6. (A) What is spherical aberration?

- (B) What is chromatic aberration?

7. (A) Describe every operation of surface grinding a finished lens from a rough blank.

- (B) Give every detail in recementing a pair of cement bifocals.

8. (A) Change the following lens powers to equivalent in diopters:

14 inches, 22 inches, 30 inches, 52 inches

- (B) Change the following to equivalent in inches:

+ 1.50 D. +3.25 D. + 5.00 D. + 12.00 D.

9. (A) A flat lens + 2.00 sph. = + 1.50 cyl. axis 55 drilled in eye glass drops out and is reversed end for end. What is the change in the axis of lens?

- (B) If put in wrong side out, what is the change?

10. (A) What wafers would you use in the following prescription:

O. D. — 0.75 sph.  $\odot$  — 4.00 x 120

---

Total + 1.75

O. S. — 1.00

---

Total + 1.50      Flat Cement Bifocal

- (B) The following periscopic lens was put into the frame, inside out:

R + 2.00  $\odot$  2° Base Up

Can the patient wear it? Explain your reason.

June, 1934.

MATTHEW J. FOWLER, Opt. D.

In June, 51 applicants were examined; and in November, 54 applicants were examined. Of this number, 14 were successful and were registered as practitioners of optometry.

There was one request for reciprocity which was denied because of the applicant's inability to meet the statute requirements.

Seven certificates of registration were revoked for non-payment of annual registration fee. Two were cancelled by reason of retirement from practice and ten were cancelled due to the decease of the practitioners. One certificate was suspended under the five year clause, section 69 of chapter 112 of the General Laws, due to the practitioner withdrawing from practice in this Commonwealth.

The Board added to its equipment a Clayton visual acuity meter, stand and screen.

During the year the law was amended. This amendment of the statute makes the requisite to practice optometry comparable with the requirements of other states and further safeguards the public health of this Commonwealth.

His Excellency Governor Joseph B. Ely appointed Dr. John J. O'Neil of Springfield on November 14, 1934, to succeed Dr. Samuel W. Baker.

His Excellency Governor Joseph B. Ely appointed Dr. Walter I. Brown of New Bedford to succeed himself on December 27, 1934.

At the annual meeting of the Board, Dr. John E. Corbett of Boston was elected Chairman and Dr. Walter I. Brown was elected Secretary for the ensuing year.

During the year the Board was cited to appear before the Judge of the Superior Court on an injunction process instituted by Dr. William H. Bain. This action was very ably defended by the Assistant Attorney General George Lourie, the Court upholding the action of the Board.

## FINANCIAL REPORT

*Receipts*

Fees received from various sources for year ending November 30, 1934 \$2,902.00

*Expenditures*

Members' services .....	\$1,752.20
Travel expenses .....	673.36
Office expenses .....	546.05
Total expenses .....	<u>\$2,971.61</u>

Respectfully submitted,

JOHN E. CORBETT, Opt. D., *Chairman*  
 WALTER I. BROWN, Opt. D., *Secretary*  
 CHARLES J. COLLINS, Opt. D.  
 JOHN J. O'NEIL, Opt. D.  
 MATTHEW J. FOWLER, Opt. D.





The Commonwealth of Massachusetts

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1935

DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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# The Commonwealth of Massachusetts

## DEPARTMENT OF CIVIL SERVICE AND REGISTRATION BOARD OF REGISTRATION IN OPTOMETRY

State House

To HONORABLE JAMES J. SUGHRUE, *Director of Registration*:

Sir: The Board of Registration in Optometry has the honor to submit to you its twenty-fourth annual report as prescribed by section 67 of chapter 112 of the General Laws.

The Board during its fiscal year ending November 30, 1935, met on sixteen days. These meetings included hearings and bi-annual examinations. Examinations were held on June 10 to 12 inclusive and November 25 to 27 inclusive. The following questions were asked under their respective subjects at the November examination.

### ANATOMY

1. Describe in detail the pectinate ligament.
2. Locate the nuclei of the optic nerve fibres. Use sketches.
3. Make a drawing of a section through the iris, labelling all parts and indicating types of cells.
4. Describe the lamina superchoroidea.

### PHYSIOLOGY

1. Give the physiology of muscle contraction.
2. Describe the physiological phase of vision.
3. Explain thoroughly the regulation of the tension of the eyeball.
4. Describe the function of the corneal endothelium.

### PATHOLOGY

1. How would you detect a very early case of retinitis pigmentosa.
2. What are the field changes in frontal sinusitis.
3. What diseases and conditions cause miosis.
4. Discuss pigmentation of the cornea and give causes of same.

Answer ten, three in each group. The tenth may be chosen from any group.

November, 1935.

JOHN J. O'NEIL, Opt. D.

### PRACTICAL OPTOMETRY

1. Where will the axis of a plus cylinder be in the correcting lens when ophthalmometer findings are as follows:

- (A) O. D. 42.50 axis 15. 44.75 axis 105.  
O. S. 44 axis 90. 42.50 axis 180.
- (B) O. D. 45 all positions.  
O. S. 45 axis 135. 46.75 axis 45.

2. If test chart is viewed through a stenopaic slit do letters appear clearest when slit is in same plane as meridian of least or greatest visual acuity? Explain.

3. In high exophoria at distance is the true adduction higher or lower than gross findings? Explain.

4. Age 20. Static O. D. + 1.75 + 0.50 axis 90. O. S. + 2. sph.; Dynamic O. D. + 3.25 + 0.50 axis 90. O. S. + 3.75 sph.; Subjective O. D. + 0.75 + 0.50 axis 90. + 1. Increase of + 0.25 lessens v. a. from 1. to .93 and causes reversal in bichrome test. What may such findings indicate?

5. Explain use of cross cylinder, monocularly and binocularly.

6. Explain what the following findings taken at 13" indicate. Patient cannot read 2 Jaeger through (1) Stronger than a -3. sph. added to Rx. and a +1.50 sph. added to Rx. (2) A -2.25 and a +2.50. (3) a -1. and a +2.

7. A patient reports that visual acuity is greatly reduced at frequent intervals. What findings would you obtain? How? Why?

8. How can one determine whether a case of myopia is pseudo or real?

9. Describe method of measuring angle Kappa of Landolt. When is angle noted as (a) positive; (b) negative?

10. Describe method of obtaining positive and negative reserve fusional convergence. Why are findings obtained?

November, 1935.

WALTER IRVING BROWN, Opt. D.

## THEORETIC OPTOMETRY

1. How may the estimated correction in the use of cross-cylinders be assumed to be correct?
2. What phorias are indicated when the test shows the following to be present:
  - a. Vertical diplopia
  - b. Homonymous diplopia
  - c. Heteronymous diplopia
3. (A) Give your definition of a duetion.  
(B) What is the main difference in technique in taking phorias and duetions?
4. Would a hyperope 2.50 or a 5.00 be most liable to develop convergent strabismus?
5. Explain no less than five reasons why some patients experience difficulty when wearing a full correction for anisometropia.
6. What is meant by adopted projection in strabismus?
7. Explain why a right hyperphoria may be associated with an in-cyclophoria, also why a left hyperphoria may be associated with an in-cyclophoria.
8. Define and illustrate:—
  - a. Tonic convergence
  - b. Accommodative convergence
  - c. Fusional convergence

9. Differentiate between quantitative and qualitative perimetry.
10. Why will a myope accept weaker powered minus lenses when he is examined subjectively with red-test letters, than when he is examined with black-test letters?

November, 1935.

CHARLES J. COLLINS, Opt. D.

## PHYSIOLOGIC OPTICS

1. Discuss the phenomena of visual projection.
2. Is the angle alpha smaller in hyperopia than in myopia? Prove geometrically.
3. Discuss Purkinje's Test (not images).
4. What is Listing's Law? Discuss.
5. Discuss the Horopter.
6. What is the relationship between accommodation and convergence? Discuss.

## THEORETIC OPTICS

1. An image is 18 cm. behind a + 6 D lens; where is the object?
  2. Give geometrical proof of Newton's formula for conjugate foci.
  3. Two thin lenses separated by a distance of 18mm, one lens having power of + 4.00 D, the other + 6.50 D; what single thin lens has equal power to the combination? Give formula and work it out.
  4. At what distance must a 500 C. P. lamp be placed to give an equal amount of illumination as a 50 C. P. lamp on a book held 20 inches away?
  5. An object 2 feet square is placed 5 feet in front of a concave mirror of 15 inch radius. What is the size of the image, and its location? Give geometrical proof.
  6. A + 5.25 lens is adjusted 15 mm. in front of an eye. What is the effective power of this lens when placed 20 mm. in front of the eye?
- Answer five questions of each group.

November, 1935.

JOHN E. CORNETT, Opt. D.

## PRACTICAL OPTICS

1. Patient requires for distance wear: + 3.50 S.  $\ominus$  + 1.50 Cyl. ax. 135 on O. D., + 3.00 S.  $\ominus$  + 2.00 ax. 45 on O. S., with 1  $\Delta$  prism base in O. U. Give the direction and amount of decentration necessary in order to get the specified prismatic power in finishing each of these lenses from regular uncut toric lenses. Explain briefly your method of calculating the amount of decentration.
2. Above patient also requires reading glasses + 2.00 D. stronger than the above with an additional base-in prismatic correction of 1  $\Delta$  prism O. U. more than needed for distance.
  - (A) What amount of decentration will be needed in each of these reading lenses?
  - (B) If finished reading lenses are 38 mm. long, what is minimum size of blanks from which they can be cut?
3. Give brief outline of your understanding of the vertex system of lens measurement.



4. (A) What is the dioptric value of the following lenses combined?

- |                     |   |                      |
|---------------------|---|----------------------|
| - 0.62 cyl. ax. 180 | ⊖ | + 1.37 cyl. ax. 90.  |
| + 1.00 sph.         | ⊖ | + 1.25 cyl. ax. 135. |
| + 1.00 cyl. ax. 180 | ⊖ | + 4.00 sph.          |
| - 0.25 sph.         | ⊖ | + 0.75 cyl. ax. 90.  |
| + 1.25 cyl. ax. 45  | ⊖ | - 0.62 cyl. ax. 135. |
| - 1.75 cyl. ax. 90  | ⊖ | + 1.37 sph.          |

(B) What form is usually best for lens of above net power?

(C) What form would probably be best if other eye is to wear + 7.00 PCX?

5. A commercial artist requires bifocals with addition of +2.25. He has previously worn single vision lenses for his close work and reading only, but dislikes the incident blur at distance. What type lenses should be most suitable for him and why?

6. To neutralize the distance portion of a bifocal lens -2.25 is required in the vertical meridian, while +1.00 neutralizes the horizontal meridian. His exact near Rx is in effect a plano cylinder lens. Write the prescription for this dual focus lens.

7. A rule held across the bridge of a patient's nose just misses eyelashes and is 3 mm. below pupils. This patient has a long nose, very wide face, 60 mm. P.D., and insists that he wants octagon frameless lenses in rocking-pad nose-piece with riding bow temples — the whole job to look as nearly as possible like a pair of Hi-bow (Ful-Vue) rimless spectacles worn by a friend. His Rx is +1.00 Cyl. ax. 180 O.U. Show by a simple diagram the front appearance of rimless octagon glasses you would give this patient (including rough outline of lenses, nose-piece and end-pieces) and state your reasons for any unusual features of it.

8. A patient wants separate spectacles for near work and distance wear. The gold-filled frame desired for distance and the zylonite frame for near when tried on patient are the right width across the front but each has the same faults: the bottom of the frame inclines outward and the left side of frame is much higher than right side. How would you correct these faults and how should general adjustment and measurement of near frame differ from the distance frame?

9. Patient wearing regular Toric Kryptoks in metal high-bridge frame with rocking zylo pads reports that just recently he sees fringe of colors around print after he has been reading awhile.

(A) What is the probable cause?

(B) How would you hope to eliminate his trouble without giving him new lenses?

(C) How could you be practically sure of eliminating and preventing any return of this complaint from this patient?

10. Using spherical lenses for neutralizing, which lenses would you use to neutralize the following:

- |                         |   |                     |
|-------------------------|---|---------------------|
| (A) + 0.75 cyl. ax. 150 | ⊖ | - 1.62 cyl. ax. 60. |
| (B) + 1.37 sph.         | ⊖ | - 2.50 cyl.         |
| (C) - 1.25 sph.         | ⊖ | - 0.87 cyl.         |
| (D) + 0.62 sph.         | ⊖ | + 0.50 cyl.         |

November, 1935.

JOHN B. O'SHEA, Opt. D.

In June, 36 applicants were examined; and in November, 29 applicants were examined. There were 14 successful candidates registered as practitioners of optometry during the year.

Eleven certificates of registration were revoked for non-payment of annual registration fee. Eleven certificates were cancelled due to the decease of the practitioners.

His Excellency Governor James M. Curley appointed Dr. John B. O'Shea of Northampton on September 23, 1935, to succeed Dr. Matthew J. Fowler of Haverhill.

At the annual meeting of the Board, Dr. John E. Corbett of Boston was elected Chairman and Dr. Walter I. Brown of New Bedford was elected Secretary for the ensuing year.

## FINANCIAL REPORT

*Receipts*

Fees received from various sources for year ending November 30, 1935	\$2,431.00
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*Expenditures*

Members' service.....	\$1,900.00
Travel expenses .....	835.84
Office expenses.....	821.66
	<hr/>
Total expenses .....	\$3,557.50

Respectfully submitted,

JOHN E. CORBETT, Opt. D., *Chairman*  
 WALTER I. BROWN, Opt. D., *Secretary*  
 CHARLES J. COLLINS, Opt. D.  
 JOHN J. O'NEIL, Opt. D.  
 JOHN B. O'SHEA, Opt. D.





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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1936

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DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



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# The Commonwealth of Massachusetts

## DEPARTMENT OF CIVIL SERVICE AND REGISTRATION

### BOARD OF REGISTRATION IN OPTOMETRY

State House

To HONORABLE JAMES J. SUGHRUE, *Director of Registration*:

Sir: The Board of Registration in Optometry has the honor to submit to you its twenty-fifth annual report as prescribed by section 67 of chapter 112 of the General Laws.

The Board during its fiscal year ending November 30, 1936 met on fourteen days. These meetings included hearings and bi-annual examinations.

The written examinations held June 22 to 24 inclusive, and November 16 to 18, were held in the Assembly rooms of the Massachusetts Society of Optometrists, 92 Tremont St., Boston, Mass.

The clinical demonstration of ability in office procedure, instrumentation, analysis, diagnosis, prognosis, prescription writing, and the determination if orthoptic procedure be necessary, the correctness of glasses prescribed as to prescription conformity and the proper adjustment of glasses to a patient were held in the clinic rooms of the above mentioned Society and at the State House.

The written examinations were as follows:

#### ANATOMY

1. Name the bones which form the floor of the orbit.
2. Discuss the blood supply of the sclera naming all arteries and veins.
3. Describe in detail the lachrymal apparatus, using sketches and labeling the various parts.
4. Explain the anatomy involved in Roenne's nasal step.

#### PHYSIOLOGY

1. Discuss the function of the autonomic nervous system.
2. Define neuron, synapse, dendrite.
3. Trace step by step and in order, the nerve pathways of the accommodation-convergence pupillary reaction.
4. To what extent do the cornea and the crystalline lens absorb ultra-violet radiation?

#### PATHOLOGY

1. When a lesion is located in the cortex what are the principal symptoms presented?
2. Give eight causes of iritis.
3. What eye diseases may tuberculosis cause?
4. Give the clinical symptoms of uveitis.

Answer ten questions, three in each group. The tenth may be chosen from any group.

June, 1936.

JOHN J. O'NEIL, Opt. D.

#### PRACTICAL OPTOMETRY

1. Describe the taking of the pupillary distance: (a) distance; (b) near. For what purpose is this measurement obtained?
2. Describe the various methods of determining pupillary reactions. If findings are abnormal, what do they indicate? Why?
3. How do you determine the relationship of a patient's light threshold to the expected?

4. How can a patient's sensitiveness to light be determined? Name three different kinds of filter glass and tell for what specific purpose they are used.

5. A patient has (a) convergence insufficiency; (b) convergence excess. What findings are necessary to learn cause? Explain (a) Technique used to obtain necessary findings; (b) Analysis of findings; (c) Procedure indicated to correct existing condition.

6. A patient's corneal curvature findings are: O.D. 42. D., 180, 43.50 D., 90. Static and dynamic retinoscopy show 0.25 D cyl. against the rule and subjectively 0.25 D against the rule equalizes lines in astigmatic chart. Explain what you would prescribe, state reason why and describe manner in which you would handle this case.

7. A nonpresbyopic patient's subjective accommodation findings are abnormal. Explain method of caring for such cases.

8. What is the expected amplitude of accommodation at age 10; 15; 20; 25; 35; 45; 50 and 60.

9. Describe how one may determine the zone of comfortable ocular functioning.

10. State the findings you would expect to find in a complete visual function investigation that would indicate the contra use of lenses as a needed aid.

June, 1936.

WALTER IRVING BROWN, Opt. D.

#### THEORETIC OPTICS

1. We have a crown glass lens index 1.53 plano convex power 12.D. It is desired to make this an achromatic lens, what lens will be used?

2. A transparent body  $1\frac{1}{2}$ " thick of unknown refractive index is available for the construction of a lens, determine its mean refractive index by the approximate prism method.

3. A D.C.X. lens of index 1.50 and .75 cm thick has a radius of 4.85 cm, what is its equivalent focal length?

4. We wish to prescribe a toric lens + 1.50Sph  $\ominus$  + .75 Cyl axis 45 and include also a prism 4D base in and 1.5 D base up. Construct the lens using glass index 1.53.

5. A test card  $24\frac{1}{10}$ " is on a wall. What is the size of the smallest mirror placed 12ft. away that will reflect the entire card?

#### PHYSIOLOGIC OPTICS

1. Explain Fechner's Law.

2. Discuss stereoscopic fusion obtained without a stereoscope. Draw diagram.

3. A Hyperope of 2D., a myope of 2D. uncorrected and an emmetrope see the same object at 1 metre distance. What is the comparative size of the retinal image in each case?

4. Discuss the optical system of the eye.

5. Discuss physiologic binocular diplopia.

June, 1936.

JOHN E. CORBETT, Opt. D.

#### THEORETIC OPTOMETRY

1. What is the Keratometer? Name the three essential parts. What are the special advantages in its use?

2. Why is it desirable to know the far and near point of vision? What does the interval between measure?

3. State the principle involved in the Maddox Rod Test?

4. Name and describe eight subdivision of Heterophoria.

5. What significance may be attached to an improvement in Vision that is obtained by the pinhole disk? Explain the Optic phenomenon.

6. What does the trial case contain?



7. What is meant by Astigmatism? What is meant by with the Rule or against the Rule?

8. Why do findings sometimes differ in measuring astigmatism by the astigmatic dial, by the stenopaic slip and by the retinoscope?

9. Under what conditions is the static method considered the best?

Under what conditions is the dynamic method considered best?

10. Why do some people with an astigmatic error and using their naked eyes see the horizontal lines on the chart distinctly, but with fogging lines see the vertical lenses plainest, while others see the same lines plainest with or without the fog?

June, 1936.

CHARLES J. COLLINS, Opt. D.

### PRACTICAL OPTICS

1. (A) What is the difference between chromatic aberration and spherical aberration?

(B) How is each of these practically eliminated from modern ophthalmic bifocal lenses?

2. Patient requires for distance wear:

O.D. — 3.50 S — 3.00 Cyl. ax. 45° 1 Δ Base-in.

O.S. — 4.00 S — 2.50 Cyl. ax. 135° 1 Δ Base-in.

Give the direction and amount of decentration necessary in order to get the required prismatic power in finishing each of these lenses from regular uncut toric lenses.

Explain your method of calculating the amount of decentration.

3. Above patient requires a reading "add" of 2.00 D. to above Rx. If his near lenses are to be made 38mm round, what is minimum size uncut lens from which each can be made?

4. Using spherical neutralization lens, one lens only at a time, name lenses you would use to neutralize each of the following:

(A) + 0.75 S + 0.62 Cyl. ax. 90

(B) — 0.37 S — 0.87 Cyl. ax. 180

(C) + 1.75 S — 2.75 Cyl. ax. 90

(D) — 1.25 Cyl. ax. 45° + 1.00 Cyl. ax. 135

5. What type bifocals would you ordinarily recommend to a landscape artist for his work? Why?

6. Which type of mounting is usually more practical optically:

Fits-U type nose glasses, folding oxfords, skull-bow spectacle frames, or riding-bow spectacles? Why?

7. Patient complains of asthenopia with his new distance glasses and has noticed that objects as seen by his left eye seem a trifle larger than when seen only by his right eye. His lenses are both + 5.00 S. Meniscus and are mounted in a gold-filled spectacle frame. How could you attempt to alleviate this condition by adjustment only? Why?

8. Patient requires bifocals made up in following Rx:

O.D. — 4.00 S — 2.00 Cyl. ax. 180.

O.S. .... + 4.00 Cyl. ax. 180.

add for near + 2.00 S. O.U.

He has had much grief with an almost identical Rx made up in regular toric kryptok form. What is probably causing his trouble and how would you make his new bifocals to overcome or greatly lessen his discomfort?

9. If above patient were a sub-presbyope needing no "add" for near, but otherwise the same type of patient, would he probably be visually uncomfortable if his Rx were made up in an ordinary pair of "corrected curve" ophthalmic lenses? If so, how would you attempt to ensure his visual comfort and efficiency?
10. A patient has high forehead, ordinary P.D., narrow face, with small chin. What type of spectacle frame would probably best improve or enhance his appearance as well as give him a practical mounting for a pair of "strong" cylindrical lenses? Why?

June, 1936.

JOHN J. O'SHEA, Opt. D.

In June, 39 applicants were examined; and in November, 35 applicants were examined. There were 24 successful candidates registered as practitioners of optometry and four reciprocity certifies issued during the year.

Thirteen certificates of registration were revoked for non-payment of annual registration fee. Eighteen certificates were cancelled due to the decease of the practitioners.

His Excellency, Governor James M. Curley, reappointed Dr. Charles J. Collins of Boston on September 16, 1936 and he was qualified on September 25, 1936.

At the annual meeting of the Board, Dr. John E. Corbett of Boston was elected Chairman, and Dr. Walter I. Brown, of New Bedford was elected Secretary for the ensuing year.

## FINANCIAL REPORT

### *Receipts*

Fees received from various sources for year ending November 30, 1936 \$2,981.15

### *Expenditures*

Members' service .....	\$1,900.00
Travel expenses .....	769.52
Office expenses .....	649.16
Total expenses .....	<u>\$3,318.68</u>

Respectfully submitted,

JOHN E. CORBETT, Opt. D., *Chairman*  
 WALTER I. BROWN, Opt. D., *Secretary*  
 CHARLES J. COLLINS, Opt. D.  
 JOHN J. O'NEIL, Opt. D.  
 JOHN B. O'SHEA, Opt. D.





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**ANNUAL REPORT**

OF THE

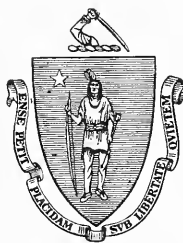
**BOARD OF REGISTRATION IN OPTOMETRY**

FOR THE

YEAR ENDING NOVEMBER 30, 1937

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DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION





# The Commonwealth of Massachusetts

## DEPARTMENT OF CIVIL SERVICE AND REGISTRATION BOARD OF REGISTRATION IN OPTOMETRY

State House, Boston

To HONORABLE JAMES J. SUGHRUE, *Director of Registration*:

Sir: The Board of Registration in Optometry has the honor to submit to you its twenty-sixth annual report as prescribed by section 67 of chapter 112 of the General Laws.

The Board during its fiscal year ending November 30, 1937, met on twenty-two days. These meetings included hearings and bi-annual examinations.

The written examinations held June 14 to 16, inclusive, and November 15 to 17, were held in the Assembly rooms of the Massachusetts Society of Optometrists, 92 Tremont Street, Boston, Massachusetts.

The clinical demonstration of ability in office procedure, instrumentation, analysis, diagnosis, prescription writing, and the determination if orthoptic procedure be necessary, the correctness of glasses prescribed as to prescription conformity and the proper adjustment of glasses to a patient were held in the clinic rooms of the above mentioned Society and at the State House.

The written examinations were as follows:

### ANATOMY

1. Describe the structure of the ciliary body in detail.
2. Locate and discuss the arch of the aorta.
3. State the origins, insertions and relations of the superior oblique, inferior oblique and superior recti muscles.
4. Locate and give a general description of the various membranes of the brain.

### PHYSIOLOGY

1. Discuss the "all or none law" in relation to the phenomenon of muscle contraction.
2. Differentiate between (a) simple reflexes; (b) coordinated reflexes; (c) convulsive reflexes. Give one example in each group.
3. (a) Give the chemical structure of rhodopsin. (b) Is its presence essential to vision? (c) Is it present in the eyes of all animals?
4. Explain the balanced action of the sphincter and dilator muscles of the iris.

### PATHOLOGY

1. Define Herpes conjunctivae, (b) ulcer serpens, (c) pannus, (d) hypopyon, (e) metastasis.
  2. What subjective symptoms would lead you to suspect the following conditions: (a) iritis; (b) glaucoma; (c) diabetic retinitis; (d) cyclitis; (e) albuminuric retinitis.
  3. Give a differential diagnosis between a history of frontal headaches caused by sinusitis and those caused by an ocular anomaly.
  4. Discuss symptoms, etiology and prognosis of superficial punctate keratitis.
- Answer ten questions, three in each group. The tenth may be chosen from any group.

June 1937.

JOHN J. O'NEIL, Opt. D.

### PRACTICAL OPTOMETRY

1. Define the following: convergence, accommodation, adduction, fusion, stereopsis. Explain your method of determining condition of each.
2. Patient reports aching eyeballs and uncertainty in walking while wearing your recently prescribed Rx of + 0.37 cyl. ax. 90. O.U., which your examination

showed to be full correction for his refractive defect. What is probable cause of this patient's discomfort and what would you do to relieve him?

3. Describe the cross-cylinder binocular near tests, dissociated and fused. What do these findings reveal, and what influence do they have on the Rx you write for a presbyope?

4. Your findings indicate the full Rx of a patient having considerable nausea and discomfort as: O.D. + 0.25 S., O.S. + 0.50 S. Would you consider the lack of this correction a probable cause of patient's distress or would you refer him for a general health examination?

5. Give a brief rule for quickly arriving at an approximately correct addition for near Rx of a presbyope.

6. Patient 68 years of age has never worn glasses and has never been conscious of any visual inefficiency, discrepancy or discomfort. He has right hypertropia of 8 prism dioptres. O.D. is emmetropic and O.S. has 2.75 D. of myopia. No general pathology and no ocular pathology manifest. What would you recommend for him for his work as proof-reader?

7. What tests constitute a minimum optometric examination in complying with the rules of the Massachusetts Board of Registration in Optometry? In your candid opinion what, if any, additional tests should be required as a usual minimum?

8. Describe the various accepted methods of doing retinoscopy, giving distances of observer and of targets, type of targets and dioptric deductions necessary from gross findings in each method.

9. What differences are to be expected between findings made under cycloplegia and those of a modern optometric examination?

10. Upon what major optometric findings do you base your diagnosis of a patient's ocular difficulties and how do you ascertain his ultimate and his immediate corrections?

June 1937.

JOHN B. O'SHEA, Opt. D.

#### THEORETIC OPTOMETRY

1. Explain why young people more readily accept full equalization in anisometropia than old ones.

2. What is the significance of the recovery point in the ductions?

3. Describe the Stereo Campimeter. What does it measure?

4. Give at least three reasons why it is preferable to take ductions with prisms over both eyes rather than prisms over one eye?

5. Differentiate between quantitative and qualitative light perception in recording lowered visual acuity.

6. Apply the following hyperopic terms in the cited cases: facultative, manifest, relative, absolute and latent. Suppose the V. A. is 20/200 and becomes 20/20 with a plus 1.00 and is still 20/20 with a plus 3.00. With the dynamic findings the V.A. is 20/20 with a plus 4.00 (no allowance for lag.).

7. What imbalance would be induced in an orthophoric patient when a pair of three diopter prisms base in are placed before each eye.

8. Which do you think is the dominating factor, accommodation or convergence?

9. Which can see better a myope of 1.00 diopter or a hyperope of 1.00 diopter and under what conditions can they see the same.

10. What is the effect of the extrinsic muscles on the relation of the visual lines of the two eyes.

June 1937.

CHARLES J. COLLINS, Opt. D.

#### THEORETIC OPTICS

1. (a) A thin symmetrical lens of +5.00 D power is made of glass of index 1.5. What are the radii of curvature of the surfaces? (b) Where must an object be placed for the above lens to form a real image twice the diameter of the object?



2. A convex lens of focal length 30 cm. and a concave lens of focal length 4 cm. are placed 18 cm. apart. Find the positions of the focal points of the combination.

3. A concave mirror has a radius of curvature of 24 cm. Find the position and size of the object when the image is erect, virtual, 4 cm. high, and 36 cm. from the surface of the mirror.

4. The minimum deviation for a prism of refracting angle  $40^\circ$  is  $34^\circ 20'$ . Find the value of the index of refraction of the material from which the prism is made.

5. A fish is 8 feet below the surface of a pool of water. A man shooting at the place where the fish appears to be points his gun at an angle of  $45^\circ$ . Assuming that it is not deflected as it enters the water, where will the bullet cross the vertical line that passes through the fish? Index of the water is 1.33.

6. An opaque globe, 2 inches in diameter, with its center at point C, is placed between a luminous sphere, of diameter 8 inches and with center at point A, and a screen. The screen is perpendicular to the straight line AC, the distance AC is 2 feet 8 inches, and point A is 3 feet from the screen. Find the width of the penumbral ring projected on the screen.

### PHYSIOLOGICAL OPTICS

1. Discuss the phenomenon of simultaneous contrast and outline an experiment to demonstrate it.

2. What are the three anatomical and physiological conditions necessary to single binocular vision? Explain the theory of corresponding retinal points.

3. Name and discuss briefly four possible causes of strabismus.

4. Differentiate between photopic (light adapted) and scotopic (dark adapted) vision.

5. Discuss briefly any one theory of color vision.

6. What are muscae volitantes? Give physiological cause. Answer five questions from each group.

June 1937.

JOHN E. CORBETT, Opt. D.

### PRACTICAL OPTICS

1. When you have completed your optometric investigation you find that your patient requires O.D.—4.50 sph  $\ominus$   $\frac{1}{2}$   $\Delta$  Base down and 3  $\Delta$  Base out. O.S. + 1.50 sph  $\ominus$  + 1.75 cyl, axis 60  $\ominus$  1  $\Delta$  Base up and 3  $\Delta$  Base out. Write a prescription for each eye having one prism in each eye equal to the above Rx.

2. A bifocal wearer has the following Rx.

O.D. — 3.50 sph  $\ominus$  + 4 cyl. axis 105

O.S. — .75 sph  $\ominus$  + 4 cyl. axis 45 + 250 add.

What bifocal lens would be best for such a case? Why? Explain in detail.

Note.—Do not answer by use of a trade marked name.

3. A bifocal wearer has the following Rx.

O.D. + 1. cyl. axis 180

O.S. + 3.50 + 3 cyl. axis 90 + 1.50 add. segments need to be nasalized 2.5 mm. each.

What prismatic power will the position of the segments give in each reading disc? What prismatic power will result when patient wears glasses?

4. How is a + 2. add produced in a fused bifocal Dist. Plane each eye index 1.52. Draw diagram and show in detail. Entire problem to be worked out.

5. (a) Explain fully the optical principle involved in red green filter test of the Clayson visual acuity meter. (b) Is there any difference in the red blue Bichrome test? If so, explain.

6. A patient requires O.D. + 1.50 sph

O.S. + 6 sph

Compute the curves for these lenses that would give an effective power as above when each are 12.5 mm from the vertex of the cornea.

7. (a) If the lenses in question No. 6 are moved 3 mm farther away from the vertex of the cornea what will their effective power be? (b) If 3 mm nearer the vertex of the cornea what will their effective power be?

8. (a) If they were minus spheres of the same power what would their effective power be 15.5 mm from the vertex of the cornea? (b) 9.5 mm from the vertex of the cornea?

9. A patient is wearing a + 7.50 sph. of the meniscus type in a frame that brings the back surface of each lens 12.5 mm from the vertex of each cornea. The right lens is 4.5 mm thick; the left lens is 6.5 mm thick. What is the difference in the effective power of each lens?

10. (a) What is the difference between Tillyer and Orthogon lenses? Explain fully.

(b) Explain what a corrected ophthalmic lens is.

June 1937

WALTER IRVING BROWN, Opt. D.

In June, 50 applicants were examined; and in November, 31 applicants were examined. There were 35 successful candidates registered as practitioners of optometry during the year.

Eight certificates of registration were revoked for non-payment of annual registration fee. Ten certificates were cancelled due to the decease of the practitioners.

At the annual meeting of the Board, Dr. John E. Corbett of Boston was elected Chairman, and Dr. Walter I. Brown, of New Bedford was elected Secretary, for the ensuing year.

The Board favored legislation to regulate the practices of opticians who were either using bait or misleading or dishonest advertising. This was passed and became effective January 1, 1937. The Board favored legislation to elevate the practice of Optometry but this was defeated there being tremendous opposition by the chain, department and jewelry stores conducting optical departments and selling glasses.

The Board opposed legislation to make it necessary for all rules and regulations of any department or division to be approved by the General Court.

## FINANCIAL REPORT

### Receipts

Fees received from various sources for year ending November 30, 1937 .....	\$2,963.00
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### Expenditures

Members' services .....	\$1,900.00
Travel expenses .....	738.15
Office expenses .....	268.50
<b>Total expenses .....</b>	<b>\$2,906.65</b>

Financial statement verified.

Approved.

GEO. E. MURPHY,  
*Comptroller.*

Respectfully submitted,

JOHN E. CORBETT, Opt. D., *Chairman*  
WALTER I. BROWN, Opt. D., *Secretary*  
CHARLES J. COLLINS, Opt. D.  
JOHN J. O'NEILL, Opt. D.  
JOHN B. O'SHEA, Opt. D.





**The Commonwealth of Massachusetts**

**ANNUAL REPORT**

OF THE

**BOARD OF REGISTRATION  
IN OPTOMETRY**

FOR THE

**YEAR ENDING NOVEMBER 30, 1938**

DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION



Government Documents  
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*University of Massachusetts*



# The Commonwealth of Massachusetts

## DEPARTMENT OF CIVIL SERVICE AND REGISTRATION

### BOARD OF REGISTRATION IN OPTOMETRY

State House, Boston

To HONORABLE JAMES J. SUGHRUE, *Director of Registration*:

Sir: The Board of Registration in Optometry has the honor to submit to you its twenty-seventh annual report as prescribed by section 67 of chapter 112 of the General Laws.

The Board during its fiscal year ending November 30, 1938 met on sixteen days. These meetings included hearings and bi-annual examinations.

The written examinations held June 13 to 15, inclusive, and November 14 to 16, were held in the Assembly rooms of the Massachusetts Society of Optometrists, 92 Tremont Street, Boston, Massachusetts.

The clinical demonstration of ability in office procedure, instrumentation, analysis, diagnosis, prescription writing, and the determination if orthoptic procedure be necessary, the correctness of glasses prescribed as to prescription conformity and the proper adjustment of glasses to a patient were held in the clinic rooms of the above mentioned Society and at the State House.

The written examinations were as follows:

#### ANATOMY

1. (a) Draw a transverse section of the chiasm indicating the different fasciculi of nerve fibers. (b) From what embryonic germ layers are the following structures mainly derived: corneal epithelium; palpebral conjunctiva; choroid; crystalline lens; retina.

2. Define: (a) articulations; (b) aponeuroses; (c) fascia; (d) periosteum; (e) endocardium; (f) alveolar; (g) protein; (h) cholesterol; (i) Gasserian ganglion; (j) glands of Moll.

3. (a) Describe and locate the pituitary gland. (b) Name and locate the principal lymph spaces of the eye.

4. (a) Name and locate the accessory sinuses. (b) Describe the canal of Schlemm and its relationship to neighboring structures.

#### PHYSIOLOGY

1. State the part played in excretion by (a) the liver; (b) the kidneys; (c) the lungs; (d) the skin. Arrange in tabular form.

2. Discuss the chemical composition of muscle and the chemical theory of muscle fatigue.

3. State with a *reason* in each case why the following assertions are true or false: (a) The active principle of the adrenal gland, epinephrine, causes dilation of the pupil when given in very minute doses. (b) A nerve that carries impulses from the surface of the body to some nerve center is called an efferent nerve. (c) The circulation of the blood from the left ventricle to the right auricle is called the portal circulation. (d) The constriction of the pupils during sleep is caused by an increased tonus of the sphincter muscle of the iris. (e) The dark-adapted eye is much more sensitive to light and hence its threshold stimulus is greatly reduced.

4. (a) Discuss proprioceptive nerve impulses. (b) Explain the theory of synaptic delay in nerve impulses. (c) Discuss the functional activities of the vestibule of the ear and its relationship to the visual function.

## PATHOLOGY

1. Give the characteristic field changes in: (a) tobacco amblyopia; (b) nephritic retinitis; (c) dental infection; (d) disease of the ganglionic and nerve-fiber layers of the retina.

2. (a) Enumerate symptoms and signs of migraine. (b) Discuss the Kayser-Fleischer ring.

3. (a) Give five predisposing causes of sympathetic ophthalmia. (b) Differentiate between the symptoms and clinical pictures of Papillitis and Papilloedema.

4. (a) Give the ocular findings in Tabes Dorsalis. (b) Describe clinical picture and histologic findings in three types of Blepharitis Marginalis.

June 1938

JOHN J. O'NEIL, Opt. D.

## PRACTICAL OPTOMETRY

1. Girl, 12 years old, 7th grade in school, referred because of failure to pass regular 20 ft. visual acuity test at school. Subjective shows need of  $-0.75$  S. O.U. for 20/20 V.A. Monocular and binocular dynamic X-Cyl. tests show  $+0.75$  S. O.U. accepted at 16 inches, which induces orthophoria at near. Habitual and induced distance phoria,  $1 \Delta$  esophoria and  $2 \Delta$  esophoria, respectively. Habitual near phoria (never wore alens correction) is  $2 \Delta$  esophoria. Positive and negative relative accommodation, taken thru plano at 13 inches,  $-2.00$  and  $+3.25$ , respectively. What would you do for this patient?

2. A house painter, 45 years old, never wore glasses, accommodative-insufficiency type, demonstrates acceptance of  $+1.00$  S. O.U. for distance, both subjectively and with static retinoscope, while subjectively and with dynamic retinoscopy he takes  $+1.50$  S. O.U. at 16 inches. He has no manifest trouble except when doing very close work on dark days or reading at night. How would you handle him as you give him his first ophthalmic correction?

3. Three year old child, nervous and fidgety, is sent to you by physician who suspects the need of refractive correction, which is the case. What would be the fewest tests you should make for this exceptional and emergency case in order to write an intelligent temporary Rx?

4. Truck-driver, 44 years old, complains of being unable to differentiate small figures on dark days or in the evening. Static retinoscopy shows net of  $+1.00$  S. O.U.; dynamic at 20 in. shows reversal with  $+1.25$  S. O.U. He can read 20/20 with  $+0.62$  S. O.U. which induces  $3 \Delta$  of exo. at 20 ft. as compared with  $2\frac{1}{2} \Delta$  of habitual exophoria. Never wore any lenses but sees best at near with  $+1.00$  S. O.U. which is indicated by X-Cyl. tests also. His habitual near phoria is  $8 \Delta$  Exo. and that induced by  $+1.00$  S's is  $11 \Delta$  exo. How would you handle this patient and why?

5. You make a complete examination of a young traveling salesman who comes to you because he just lost the glasses he had worn constantly for three years. You determine that the combination which gives best vision singly and binocularly is: O.D.  $+1.50$  S., O.S.  $+3.00$  S.  $\subset +2.00$  cyl. axis  $60^\circ$ . V.A. with these is: O.D. 2-/20, O.S. 20/40. This correction makes him "feel funny" as he looks thru these test lenses binocularly. It is impossible to learn from him or anyone else whether he wore an approximately similar Rx before or not. How would you proceed? Why?

6. How do you determine whether a consultant is presbyopic or not?

7. What part do the monocular and binocular X-Cyl. findings play in your writing of a patient's Rx?

8. A landscape artist needs a near point addition of  $+2.75$  for his work at 16 inches. Is he overcorrected or undercorrected for infinity?

9. A mail-carrier (house to house delivery) needs this correction: O.D.  $+1.00$  S., O.S.  $+1.00$  Cyl. axis, 180, add  $+2.25$  S. O.U. What should be the best type of bifocal for him and why?



10. What are the tests specifically required for an optometric examination in Massachusetts?

June 1938.

JOHN B. O'SHEA, Opt. D.

#### THEORETIC OPTICS

1. A 30 Candle Power lamp and an 8 Candle Power lamp are at the same height 100 centimeters apart. At what point or points along their line of centers do they give the same illumination?

2. A concave mirror has a radius of curvature of 12 centimeters. Find the position, nature and size of the image when an object 4 millimeters high is placed (a) 18 centimeters from the mirror; (b) 4 centimeters from the mirror.

3. A convex and a concave lens each of 8 inch focal length are placed 4 inches apart. Find the position of the image if the object is at a distance of 12 inches beyond (a) the convex lens; (b) the concave lens.

4. Find the focal length and the position of the principal points of a concentric glass lens surrounded by air with radii  $r = + 8$  centimeters,  $r' = + 5$  centimeters. The lens is made of glass of index 1.50.

5. A cylindrical tube, 2 cm. in diameter and 10 cm. long, is closed at one end by a thin convex lens of focal length 4 cm. If this end of the tube is pointed towards a distant object, what will be the position and diameter of the entrance-pupil. Where would the object have to be in order that the lens itself might act as entrance-pupil?

6. Given the following Rx: O.D.  $+ .50 \text{ } \ominus -2.00 \text{ cyl ax } 180$ . How would you decenter this lens to produce 2 prism diopters base up and in along the 45th meridian?

#### PHYSIOLOGICAL OPTICS

1. Red light is found to penetrate fog more effectively than light of any other color. Would the penetrating power of an arc lamp be increased, unchanged or diminished by passing its rays through red glass? Explain your answer fully.

2. Define the following terms: (a) Dyschromatopia. (b) After-image. (c) Simultaneous contrast. (d) Argyll-Robertson Pupil. (e) Interval of Sturm.

3. Discuss briefly three changes which take place in the retina when it is stimulated by light.

4. (a) Discuss the theory of and two uses for the stereoscope. (b) Discuss the theory of and two uses for the stroboscope.

5. (a) What is meant by the term "threshold stimulus?" (b) Give four or more factors upon which the threshold stimulus of the eye depends.

6. (a) Define light. (b) Differentiate between the energy spectrum and the light spectrum.

Answer five questions from each group.

June 1938

JOHN E. CORBETT, Opt. D.

#### THEORETIC OPTOMETRY

1. Differentiate between quantitative and qualitative light perception in recording lowered visual acuity.

2. (a) Describe the perimeter. (b) What does it measure?

3. Give the two reasons accounting for the low ducting power often found in the presence of esophoria?

4. What relationship exists between the true measure of the abduction and the manifest measure of the horizontal tonicity?

5. Explain how it is possible at least theoretically to determine the measure of negative relative convergence in a given case without actually taking a measure of the same.

6. Give several reasons to show that accommodation and convergence are two individual functions? Wherein are they associated?

7. How would you account for the effect of a plus correction, in some cases increasing the amount of base in prism overcome at distance, while in other cases there is a decrease in the amount of base in prism overcome at distance?

8. (a) Name two factors that determine the power of the cross-cylinder to be employed in a given case. (b) How may the cross-cylinder be employed to measure the positive and negative relative convergence?

9. What is the law of reciprocal innervation?

10. How do you account for the normally expected .25 to .50 discrepancy between the static skiametry and the best subjective Rx?

June 1938.

CHARLES J. COLLINS, Opt. D.

### PRACTICAL OPTICS

1. A lens has curves that measured on a lens measure + 16. sph. + 2.50 cyl. and—6.50 sph. inside. What will this lens neutralize? (a) When minus lenses are placed in contact with the convex curve? (b) When measurements are made on any instrument registering in vertex dioptres.

2. How much of a prism can be incorporated in a lens 40×44 drop eye that is to be cut from a 50 mm blank having optical and geometrical centers coincide. (a) B up or down. (b) B in or out.

3. Show by problem how to determine the centers in bifocal spectacles.

4. State all factors to be considered in obtaining proper adjustment of a pair of spectacles.

5. Why are different shape segments necessary in bifocals?

6. If you found that your patient needed the following prescription, what instructions would you give your supply house: O.D. + 4. + 3.75 axis 30. O.S. + 4. + 3.75 axis 120.

7. In surfacing a lens + 1. S. + 1.50 cyl. ax 90 1  $\Delta$  up and 1  $\Delta$  out how much difference would there be between the thin and thick edge of a 40 mm round lens in the (a) 180 meridian. (b) 90 meridian.

8. In surfacing a + 6.5 + .75 cyl. corrected lens what factors could change the vertex power of this lens, the curves on the tools being accurate.

9. Describe exactly how to lay out a bifocal lens blank for surfacing.

10. Describe the difference between the following bifocals. (a) Panoptic. (b) Orthogon D. (c) Univis. (d) Ultex A. (e) Ultex B.

June 1938,

WALTER IRVING BROWN, Opt. D.

In June, 45 applicants were examined; and in November, 44 applicants were examined. There were 25 successful candidates registered as practitioners of optometry during the fiscal year.

Seven certificates of registration were revoked for nonpayment of annual registration fee. Nineteen certificates were cancelled due to the decease of the practitioners.

At the annual meeting of the Board, Dr. Walter I. Brown, of New Bedford was elected Chairman, and Dr. John E. Corbett of Boston was elected Secretary, for the ensuing year.

The Board sought legislation to give adequate protection of the visual care of the public, and House Bill 22144 was passed by both branches of the Legislature and upon recommendation of the Governor was referred to the Attorney General's office on the question of constitutionality. The Attorney General reported and recommended an amendment to the law that the Governor then returned to the Legislature with such recommendation. The bill, as amended, was passed by both house and senate and then vetoed by the Governor. It was then enacted over the Governor's veto.

Upon a hearing before the Justice of the Supreme Court relevant to the constitutionality of the Act by the Kay Jewelry Co., the Board was enjoined from operating in accordance with the act until such time as the constitutionality had been decided upon by the Supreme Bench.

# FINANCIAL REPORT

## Receipts

Fees received from various sources for year ending November 30  
1938 . . . . . \$3,137.00

## Expenditures

Members' services . . . . .	\$1,900.00
Travel expenses . . . . .	566.43
Office expenses . . . . .	183.58
	<hr/>
Total expenses . . . . .	\$2,650.01

Financial statement verified.  
Approved.

GEO. E. MURPHY  
*Comptroller.*

Respectfully submitted,

WALTER I. BROWN, Opt. D., *Chairman*  
JOHN E. CORBETT, Opt. D., *Secretary*  
CHARLES J. COLLINS, Opt. D.  
JOHN J. O'NEIL, Opt. D.  
JOHN B. O'SHEA, Opt. D.



The Commonwealth of Massachusetts

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION  
IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1939

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DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION





# The Commonwealth of Massachusetts

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## DEPARTMENT OF CIVIL SERVICE AND REGISTRATION

State House, Boston

### BOARD OF REGISTRATION IN OPTOMETRY

To HONORABLE MARGARET M. O'RIORDAN, *Director of Registration*:

DEAR MADAM: The Board of Registration in Optometry has the honor to submit to you its twenty-eighth annual report as prescribed by section 67 of chapter 112 of the General Laws.

The Board during its fiscal year ending November 30, 1939 met on eighteen days. These meetings included hearings and bi-annual examinations.

The written examinations held June 12 to 14, inclusive, and November 20 to 22, were held in the Assembly rooms of the Massachusetts Society of Optometrists, 92 Tremont Street, Boston, Massachusetts.

The clinical demonstration of ability in office procedure, instrumentation, analysis, diagnosis, prescription writing, and the determination if orthoptic procedure be necessary, the correctness of glasses prescribed as to prescription conformity and the proper adjustment of glasses to a patient were held in the clinic rooms of the above mentioned Society and at the State House.

The written examinations were as follows:

#### ANATOMY

1. (a) Give the gross dimensions of the average eyeball. (b) Name the structures that are transmitted by the following foramina: Anterior ethmoidal; Ethmoidal fissure; Infraorbital; Sphenoidal fissure; Malar.

2. (a) Discuss the blood supply of the fovea; (b) Describe the Circle of Willis.

3. Answer the following statements *true* or *false*. If false, rewrite to make statement true: (a) The Gasserian ganglion is located in the Spheno-maxillary fossa close to the Spheno-palatine foramen; (b) The fissure of Sylvius is located between the occipital and parietal lobes, just dorsal to the left cerebral hemisphere; (c) The ciliary ganglion is situated in the posterior portion of the orbit and has three roots, sensory, motor and sympathetic; (d) The Solar Plexus is formed by the left superior cardiac nerve, branches of the pneumogastric and filaments from the deep cardiac plexus; (e) Goll's tract is in the dorsal region of the spinal cord next to the posterior fissure and its fibres ascend to the medulla where they end in the nucleus gracilis.

4. (a) What are the glands of Waldeyer? (b) What cranial nerve arises from the pyramid of the medulla, deeply from the floor of the 4th ventricle, beneath the eminentia teres? (c) Locate the Cervical Plexus.

JOHN J. O'NEIL, Opt. D.

June, 1939

#### PHYSIOLOGY

1. (a) Explain the variations in velocity of the blood circulation in different parts of the vascular system. (b) Give the main facts regarding the function of the vasomotor apparatus insofar as it concerns the arteries.

2. Answer the following statements *true* or *false*. If false, rewrite statement to make it true: (a) Experiments have proven that the effect of continuous conduction of electric current by a nerve fibre, is to produce extreme fatigue. (b) The hormone which regulates the amount of sugar in the blood is Cortin. (c) Experiments would indicate that visual purple is a conjugated protein of the same type of structure as hemoglobin and is related to the carotene com-

pounds. (d) That part of the brain which acts as a relay station for all afferent tracts (except the olfactory and vestibular) and passes these sensory impulses to the cerebrum, is the cuneas. (e) Miotics cause constriction of the pupil by stimulating the endings of the constrictor nerve fibres in the sphincter muscle of the iris.

3. (a) Give five examples of carbohydrates, and state why each is important to the human organism. (b) Give the physical properties and chemical composition of protoplasm.

4. What is the function of Bowman's capsule in the kidney?

### PATHOLOGY

1. (a) Describe the appearance of the fundus in Leukemic Hemorrhagic Retinitis. (b) How would you recognize a typical cicatrix of a ruptured choroid?

2. (a) Describe the visual fields in chronic glaucoma, in the usual order in which the departures from normal occur. (b) In what respect does a congenital crescent differ from a myopic crescent?

3. (a) Name and fully describe three types of bacteria, using sketches. (b) Define Pinguecula; Exogenous; Endogenous; Salmon-patch; Amaurosis.

4. (a) Name five possible diet deficiencies which could be contributing factors to ocular pathology and how would you recognize them. (b) What significance would you attach to a slight blurring of the disc margin limited to a portion of the Circumference?

Answer ten questions only, three from each group. The tenth may be selected from any group.

JOHN J. O'NEIL, Opt. D.

June, 1939

### PRACTICAL OPTOMETRY

1. Describe in detail your subjective test for "distance" lens acceptance. What is its significance? What deductions from this finding, if any, should be allowed in order to ensure clearest visual acuity at infinity?

2. How many and what tests are required as a minimum routine optometric procedure in Massachusetts?

3. Describe the subjective test which you employ at near to assist in determining the reading or close-work correction in: (a) A young person; (b) A presbyope.

4. How is the "bi-chrome" test made and what can you learn from it?

5. Among the optometric tests routinely required by the Massachusetts Board of Registration have you an indicator to the special need of perimetry or campimetry? Explain.

6. Construct a hypothetical case needing for constant wear such a correction as: O.D. + 1.00  $\odot$  + 0.50 ax 90, O.S. + 0.75  $\odot$  + 0.50 ax 30, although this Rx is *not* the same as your distance subjective finding. Give age, sex and occupation of this consultant.

7. How do you apply your keratometric findings?

8. Lady patient, 42 years of age, never wore glasses. Complaint is exhaustion late in the day. Your examination shows that the maximum Rx which she could wear for distance and for her work as a waitress would be: O.D. + 0.25 S., O.S. + 0.50 S. Check which you would do: (a) Expect to help her with this lens correction; (b) Put on more plus lens O.U.; (c) Refer her back to her family physician who advised her that she is apparently "Only tired out."

9. A professional baseball player, 30 years old, never wore glasses but is in a batting slump and suspects his vision. You find his naked V. A. 20/25



O.D., O.S. and O.U. His binocular balance is very good but everything points to the need of, for 20 foot vision:

$$\text{O.D.} + 0.25 \text{ } \oslash \text{ } + 0.62 \text{ ax. } 120.$$

$$\text{O.S.} + 0.25 \text{ } \oslash \text{ } 0.62 \text{ ax. } 60.$$

What correction would you feel might help him immediately for his work as an outfielder?

10. A high school senior, girl, 17 years of age, is planning to enter college in the fall. She is a functional myope and she has been getting more myopic steadily for the past two years. This girl really needs bifocals to make her comfortable and visually efficient and to check her myopia. Give optometric data of such a case, including all needed findings, her old Rx, her last previous Rx, and her new Rx.

JOHN B. O'SHEA, Opt. D.

June, 1939.

#### THEORETIC OPTICS

1. A parallel pencil is incident at an angle of  $35^\circ$  on the plane surface of a block of glass of refractive index 1.523. Find the angle between the light reflected from the surface and that refracted into the glass.

2. In measuring the refractive index of a prism for yellow light on a spectrometer, the refracting angle is found to be  $60^\circ 14'$  and the angle of minimum deviation  $42^\circ 25'$ . Find the refractive index of the glass.

3. A glass sphere has a diameter of 10 centimeters, index of refraction 1.53. Two bubbles appear to be: (a) exactly at the center; (b) midway between the center and the front surface. Find their actual positions.

4. A real image is formed 71 feet from a thin lens whose focal length is plus 3.69 inches. Calculate the magnification.

5. Two lamps of 30 and 20 candle power respectively are 2 meters apart. Find *two* positions on their line of centers where a screen would receive equal illumination from each lamp.

#### PHYSIOLOGICAL OPTICS

1. Discuss critically the Young-Helmholtz theory of color vision.

2. Define: Horopter, Vieth-Mueller circle, Panum's fusional Area.

3. Name and discuss six defects of the eye exclusive of refractive errors. (diagrams).

4. Of what clinical importance are the Purkinje-Sanson Images? What is meant by Purkinje's Figures? By the Purkinje Phenomenon?

5. Illustrating with three object-image pencils show with diagrams only an emmetropic eye: (a) With accommodation relaxed. (b) With three diopters of accommodation in use.

JOHN E. CORBETT, Opt. D.

June, 1939

#### THEORETIC OPTOMETRY

1. What theories are advanced for the reason of difference between astigmatic correction accepted and keratometer astigmatic findings?

2. What theory is advanced for the so called Amblyopia Ex Anopsia?

3. What is the theory of blur out points in: (a) Adduction; (b) Abduction findings.

4. What is the theory of the Clayson duo-chrome test? Illustrate.

5. What theories have been expounded as to the use of prisms for correcting exophoria?

6. Describe and illustrate the difference between a Stereo-Campimeter, Perimeter and Tangent screen.

7. What theory is advanced for the normally expected difference between the static skiametry and the correct prescription findings?

8. Give five reasons why an individual might experience difficulty when wearing a full correction for anisometropia.

9. Differentiate between quantitative and qualitative perimetry.

10. Explain and diagram adopted projection in Strabismus.

CHARLES J. COLLINS, Opt. D.

June, 1939

### PRACTICAL OPTICS

1. What will be the thickness in mm. at the base of a sharp edge (knife edge) prism of 11.  $\circ$  Index 1.523. 50 mm. in diameter.

2. A spherical surfacing tool is made to grind a convex surface of +0.62 D. What is the radius of curvature. Index 1.53.

3. What would the dioptral value be for the same curve as in problem 2 if the index was 1.69?

4. Transpose the following:

a) -4.00 sph  $\circ$  +4.00 cyl.

b) -1.00 sph  $\circ$  +4.00 cyl.

c) +4.00 sph  $\circ$  -1.00 cyl.

5. Define the following terms:

a. Addition

b. Axis

c. Base curve

d. Chromatic aberration

e. Cutting line

f. Dispersion

g. Distortion

h. Far point

i. Geometric center

j. Optical center

k. Vertex

6. The following Rx is made in an Ultex A bifocal. Locate: 1. Distance center; 2. Reading portion center; 3. Resultant center. O.D. +1.00 sph  $\circ$  +3.50 cyl. axis 135 add +2.00 Lens 40 mm. Rd. Height of disc 16 mm. Disc nasalized 2 mm.

7. In laying out a Panoptic or Fulyue bifocal for surfacing, describe what procedure you should follow to have reading area nasalized 2.5 mm. for the left eye.

8. Write a Rx without prism in the distance in which, although the segment is nasalized 2 mm., there would be a base out effect at the reading center.

9. What type of bifocal is best for: (a) Very strong convex distance Rx; (b) Very strong concave distance Rx.

10. Describe three types of cataract lenses and explain which one is best.

WALTER IRVING BROWN, Opt. D.

June, 1939

In June, 62 applicants were examined; and in November 56 applicants were examined. There were 43 successful candidates registered as practitioners of optometry during the fiscal year.

Eight certificates of registration were revoked for nonpayment of annual registration fee. Twelve certificates were cancelled due to the decease of the practitioners.

His Excellency, Governor Leverett Saltonstall appointed Dr. Frank S. Jones of Boston on October 11, 1939 to succeed Dr. John J. O'Neil of Springfield.

At the annual meeting of the Board, Dr. Walter I. Brown of New Bedford was elected Chairman, and Dr. John E. Corbett of Boston was elected Secretary, for the ensuing year.

The Board sought legislation to give adequate protection of the visual care of the public, and House Bill #2144 was passed by both branches of the Legislature and upon recommendation of the Governor was referred to the Attorney General's office on the question of constitutionality. The Attorney General reported and recommended an amendment to the law that the Governor then returned to the Legislature with such recommendation. The bill, as amended, was passed by both House and Senate and then vetoed by the Governor. It was then enacted over the Governor's veto, on June 21, 1938.

Upon a hearing before the Justice of the Supreme Court relevant to the constitutionality of the Act by the Kay Jewelry Co., the Board was enjoined from operating in accordance with the act until such time as the constitutionality had been decided upon by the Supreme Bench.

# FINANCIAL REPORT

## *Receipts*

Fees received from various sources for year ending November 30,  
1939 . . . . . \$3,746.00

## *Expenditures*

Members' services . . . . .	\$1,900.00
Travel expenses . . . . .	235.41
Office expenses . . . . .	902.34
	<hr/>
Total expenses . . . . .	\$3,037.75

Financial Statement Verified.

Approved.

GEO. E. MURPHY,  
*Comptroller.*

The clerical services of the Board are included in the appropriation of the Director of Registration, Personal Services.

Respectfully submitted,

WALTER I. BROWN, Opt. D., *Chairman*  
JOHN E. CORBETT, Opt. D., *Secretary*  
CHARLES J. COLLINS, Opt. D.  
FRANK S. JONES, Opt. D.  
JOHN B. O'SHEA, Opt. D.



*The Commonwealth of Massachusetts*

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ANNUAL REPORT

OF THE

BOARD OF REGISTRATION  
IN OPTOMETRY

FOR THE

YEAR ENDING NOVEMBER 30, 1940

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DIVISION OF REGISTRATION  
DEPARTMENT OF CIVIL SERVICE AND REGISTRATION





# The Commonwealth of Massachusetts

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## DEPARTMENT OF CIVIL SERVICE AND REGISTRATION

State House, Boston

### BOARD OF REGISTRATION IN OPTOMETRY

TO MRS. MARGARET M. O'RIORDAN, *Director of Registration*:

DEAR MADAM: The Board of Registration in Optometry has the honor to submit to you its twenty-ninth annual report as prescribed by section 67 of chapter 112 of the General Laws.

The Board during its fiscal year ending November 30, 1940, met on eighteen days. These meetings included hearings and bi-annual examinations.

The written examinations held June 10 to 12 inclusive, and November 18 to 20, were held in the Assembly rooms of the Massachusetts Society of Optometrists, 92 Tremont Street, Boston, Massachusetts.

The clinical demonstration of ability in office procedure, instrumentation, analysis, diagnosis, prescription writing, and the determination if orthoptic procedure be necessary, the correctness of glasses prescribed as to prescription conformity and the proper adjustment of glasses to a patient were held in the clinic rooms of the above mentioned Society and at the State House.

The written examinations were as follows:

#### ANATOMY

1. Describe the lachrymal apparatus in detail.
2. Name and describe the anterior and posterior lymph spaces.
3. Discuss the composition and structure of the vitreous body in detail.
4. Describe the crystalline lens in detail.

#### PHYSIOLOGY

1. What is an efferent nerve impulse? An afferent nerve impulse?
2. What is your understanding of reciprocal innervation? Give an illustration.
3. What is your understanding of the three phases of the visual act? Illustrate by diagram.
4. Discuss briefly stereoscopic vision.

#### PATHOLOGY

1. Define:
  - (a) positive scotoma
  - (b) negative scotoma

What intra-ocular condition might cause a positive scotoma?

2. Describe the fundus picture in:

- (a) diabetic retinitis
- (b) Albuminuric retinitis

Give the prognosis in each type of case.

3. What is your understanding of embolism of the central artery of the retina? Give symptoms and possible causes.

4. Give the characteristic symptoms in:

- (a) iritis
- (b) simple conjunctivitis
- (c) phlyctenular conjunctivitis

Arrange in tabular form.

Answer three questions from each group.

The tenth may be chosen from any group.

FRANK S. JONES, Opt. D.

### PRACTICAL OPTICS

1. What is the purpose of a corrected ophthalmic lens?
2. How is the result desired as expressed in your answer to question one accomplished?
3. Explain thoroughly the making of a — 3.25 sph. corrected ophthalmic lens from computation of essentials thru finished lens.
4. Solve the following lens problems: (A) Locate the resultant center in a Panoptic bifocal, Dist. B — 0.50 sph.  $\odot + 0.50$  cyl. Axis  $90 + 2.75$  sph. add. (B) Dist. Rx  $+ 1.25$  sph.  $\odot + 0.50$  cyl. Axis  $180 + 2.75$  sph. add. Lenses in both A and B are 40 mm. rd. and the segment is 3 mm. below center.
5. Locate the resultant centers if the lenses in A and B of question No. 4 were Orthogon D. or Tillyer D.
6. A lens  $+ 3.00$  cyl. axis 180, 40 mm. rd. is mounted in a spectacle; it is 2.5 mm. center thickness. What is the cylindrical power at axis  $60^\circ$  or axis  $120^\circ$ ?
7. A  $+ 7.00$  sphere to be finished  $37 \times 40$  mm. octagon drop shape is is decentered axis 30 to equal 2  $\nabla$ . How many millimeters is it decentered?
8. Transpose the following in as many different ways as possible.
  - (a) — 0.50 sph.  $\odot + 0.50$  cyl. axis 135
  - (b) — 1.50 sph.  $\odot + 2.75$  cyl. axis 90
  - (c)  $+ 3.25$  sph.  $\odot + 1.12$  cyl. axis 10
  - (d)  $+ 2.25$  sph.  $\odot - 1.75$  cyl. axis 75
  - (e) — 0.50 sph.  $\odot - 2.75$  cyl. axis 115
9. How may increase in the size of the ocular image be obtained by ophthalmic lenses without changing the dioptral value of the lens? Rx  $+ 1.25$  sph.  $\odot + .25$  cyl. axis 90.
10. What one of the following filters absorbs the most yellow: (C or No. 3 shade) of: Noviol; Calobar; Softlite; Crookes; Ray Ban. Explain answer.

WALTER IRVING BROWN, Opt. D.

### THEORETIC OPTOMETRY

1. Of what significance is esophoria when found:
  - (a) at distance only,
  - (b) at reading point only,
  - (c) at all ordinary points?
2. Discuss the theory of Tait dynamic retinoscopy. What is the purported value of this test to you and to the patient?
3. Why may the finding of appreciably less net plus in static retinoscopy than in the "distance subjective" be indicative of pathology?
4. What is the probable cause (non-pathologic) of a poor convergence amplitude? What (in inches) is your expected nearpoint of convergence at ages of 15 years, 30 years, 45 years, and 60 years respectively?



5. In taking the "habitual phoria" at near (through old or no Rx, as the case may be) when does the finding of *high exophoria* not indicate that additional plus lens must be prescribed very sparingly? Be specific.
6. What is the theory of the pin hole disc test? How does it differ from the stenopaic slit?
7. What is the theory of the chromatic or Cobalt test? How does it differ from the bichrome test?
8. What is the theory of the Monocular cross cylinder check test? Illustrate.
9. What is the theory of the Maddox Rod test?
10. What is the Herring theory of color vision?

CHARLES J. COLLINS, Opt. D.

### PRACTICAL OPTOMETRY

1. Healthy boy, 17 years old, senior in high school, complains of recurrence of poor distance vision despite one-year-old Rx of  $-1.25$  S. O.U., his first glasses. (His naked vision is much poorer.) He is leaving next week for small college 1,000 miles away. Write all data for complete optometric examination of such a case with correction and advice given this patient.

2. Man 68 years old never has worn glasses and has bragged of "perfect vision" until he recently discovered that he cannot see clearly in the distance with his right eye. Now he is worried and places himself in your hands. He is in perfect health. His refraction is: O.D. 2.75 D. Myopic; O.S. Emmetropic. What would you do for him?

3. Dentist, 60 years of age, has need for distance Rx of: O.D.  $+0.50$  S.  $= +0.50$  Cyl. ax 90, O.S.  $-1.00$  S. which he has been wearing constantly as basic Rx of flat-top-fused-segment bifocals. His bifocal addition has been  $+2.25$  S. O.U., with which he "cannot see close enough for work on tooth cavities or far enough to pick out proper drills from implement shelf 26 inches away from his eyes". For his close work he really needs an addition of  $+2.75$  S. O.U. What would you do for him?

4. Child, 3 years old, has convergent squint of left eye. No history of convulsions or other indication of spastic involvement. His refraction as shown by static retinoscope is: O.D.,  $+8.00$  S.  $= +0.50$  C. ax 90; O.S.  $+9.00$  S.  $= +0.25$  C. ax 90. Dynamic (Monocular) at 13 inches shows gross add of about 1. D. O.U. Other findings unreliable. What would you do for him?

5. Big, husky college football player has trouble studying at night—"just cannot keep awake". Your findings indicate that all he needs is  $+1.00$  S. O.U. for study at 16 inches, but no Rx for distance. Write complete data and reasoning for his case.

6. Major league baseball player, outfielder, comes to you because he is in a batting slump and thinks his vision may be at fault. Your 20 ft. subjective fog test, borne out by other findings, shows: O.D.  $+0.50$  S.  $\ominus +0.50$  C. ax 45; O.S.,  $+0.75$  S.  $= +0.50$  C. ax 135. What Rx would you give him and why?

7. The *lack* of which of these needed Rx's would be most likely to bother a waiter in a hotel? (Indicate your first, second and third choices by their respective letters)

(A) O.U.  $+0.50$  S.

(B) O.D.  $+0.50$  S., O.S.  $+0.12$  S.

(C) O.D.  $+0.37$  Cyl. ax 60; O.S.  $+0.37$  Cyl. ax 120.

8. Describe your method of doing the near-point cross-cylinder tests, stating procedure from start to finish, chart used and its position, the X-Cyls. used, and the significance of the findings.

9. (A) Functionally acquired myopia of 4.00 D. O.U. would reduce the apparent amplitude of accommodation (measured with Rx on) by what amount, if any? Why?

(B) What significance, if any, do you attach to size of pupils, in general consideration of a case.

10. Write complete data for a case which cannot wear comfortably the full plus of the subjective altho that is  $+1.00$  S. O.U. The patient is a 25 year old teller in a bank.

JOHN B. O'SHEA, Opt. D.

### THEORETIC OPTICS

1. A plane mirror 2 feet high is fixed on a wall of a room with its lower edge 3 feet above the floor. If a man whose eyes are 6 feet above the floor stands 3 feet in front of it, what will be the length of floor that he can see by reflection?

2. What is the difference in the apparent thickness of a biconvex lens (index 1.50) having radii of curvature of 8 cm and 20 cm and cent thickness 2 mm., the lens being examined first from one side and then from the other.

3. Where must an object be placed in front of a convex lens of 8 cm focal length to give an image:

(a) 25 cm. in front of the lens.

(b) 25 cm. behind the lens.

State in each case whether the image is real or virtual.

4. (a) What is meant by chromatic aberration of a lens?

(b) The light from a distant small source of light is brought to a focus by means of a thin equi-convex lens with radii of curvature of 20 cm. If the refractive indices for red and blue light be 1.515 and 1.524 respectively, find the chromatic aberration of the lens (expressed in millimeters.).

5. The front surface of the cornea of an eye has a radius of curvature of 8 mm.; what will be the size and position of the image formed by the reflection of an object 20 cm. in front of the cornea and 6 cm. long?

6. Two lamps whose candle-powers are in the ratio of 2 to 1 are placed at opposite ends of a 2 meter bench. In front of the more powerful lamp is placed a screen which absorbs 30 per cent of the incident light. What will be the position of a photometer screen between the lamps when its sides are equally illuminated?

### PHYSIOLOGICAL OPTICS

1. Illustrating with three object-image pencils show with diagrams only an emmetropic eye:

(a) With accommodation relaxed.

(b) With three diopters of accommodation in use.

2. Define:

(a) stereopsis

(b) anaglyph

(c) primary colors

(d) primary color sensations

(e) parallax

(f) mydriasis

(g) cycloplegia

(h) fusional convergence

(i) accommodation

(j) visual acuity

3. A poster is printed in red letters on a white background. What would be its appearance (a) when illuminated with red light; (b) when illuminated with green light? Explain your answers.

4. Name and discuss briefly four factors which affect the pupil size.

5. (a) Discuss briefly the relationship between accommodation and convergence.  
(b) Define relative accommodation: relative convergence; accommodative lag.
6. Describe an experiment in which homonymous physiological diplopia is produced, and tell how it can be varied so that the diplopia will be heteronymous.
- Answer five questions from each group.

JOHN E. CORBETT, Opt. D.

In June, 46 applicants were examined; and in November 30 applicants were examined. There were 44 successful candidates registered as practitioners of optometry during the fiscal year. One certificate of Registration by reciprocity was issued during the fiscal year.

Nine certificates of registration were revoked for nonpayment of annual registration fee. Seven certificates were cancelled due to the decease of the practitioners.

His Excellency, Governor Leverett Saltonstall appointed Dr. Percival Gregory of Springfield on September 4, 1940, to succeed Dr. John B. O'Shea of Northampton. Dr. Gregory qualified on September 11, 1940.

At the annual meeting of the Board, Dr. Walter I. Brown of New Bedford was reelected Chairman, and Dr. John E. Corbett of Boston was reelected Secretary, for the ensuing year.

FINANCIAL REPORT

*Receipts*

Fees received from various sources for year ending November 30,									
1940	.	.	.	.	.	.	.	.	\$2,813.15

*Expenditures*

Members' services	.	.	.	.	.	.	.	.	\$1,900.00
Travel expenses	.	.	.	.	.	.	.	.	528.79
Office expenses	.	.	.	.	.	.	.	.	402.17
Total expenses									\$2,830.96

Verified

Approved.

WALTER S. MORGAN,  
*Comptroller.*

The clerical services of the Board are included in the appropriation of the Director of Registration, Personal services.

Respectfully submitted,

WALTER I. BROWN, Opt. D., *Chairman*  
JOHN E. CORBETT, Opt. D., *Sec.*  
CHARLES J. COLLINS, Opt. D.  
FRANK S. JONES, Opt. D.  
PERCIVAL GREGORY, Opt. D.





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